NO TITLE-PAGE & INDEX ISSUED

Rock Products

DEVOTED TO

Concrete and Manufactured Building Materials

Vol. IX. CHICAGO, ILL., JULY 22, 1909. No. 1.

CAROLINA PORTLAND CEMENT COMPANY

We are the largest distributers of Portland Cement, Lime Plaster, Fire-brick and General Building Material in the Southern States, and have stocks of Standard Brands at all of the Atlantic and Gulf Seaports, and at our interior mills and warehouses, for prompt and economical distribution to all Southern territory. Write for our delivered prices anywhere. Also Southern agents for the "Dehydratine" waterproofing material. "Universal," "Acme" and "Electroid" Brands Ready Roofing. Get our prices.

Charleston, S. C. Birmingham, Ala. Atlanta, Ga. New Orleans, La.

DEXTER Portland Cement THE NEW STANDARD

Sole Agents SAMUEL H. FRENCH & CO. Philadelphia

SPECIAL FEATURES IN THIS NUMBER

Sewer Pipe of Large Section Reinforced with Triangle mesh Fabric.

The Building Material Concerns serving the Indianapolis Market.

Twelfth Annual Meeting of the American Society for Testing Materials.

Progress Report of the Joint Committee on Concrete and Reinforced Concrete.

A Model Bakery Establishment at Louisville, Ky.

The Galveston Sea Wall Proved a Success.

UNION MINING COMPANY

Manufacturers of the Celebrated

MOUNT SAVAGE FIRE BRICK

GOVERNMENT STANDARD.

DEVOTE a special department to the manufacture of Brick particularly adapted both physically and chemically to

Lime Kiln and Cement Kiln Construction

Large stock carried. Prompt shipments made. Write for quotations on Standard and Special shapes, to

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Mount Savage, Md.

CAPACITY, 60,000 PER DAY. ESTABLISHED 1841.

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Manufactured by

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Is used for sawing stone in more than a dozen states. Cuts more and lasts longer than any other sand on the market. Unexcelled for Roofing, Facing Cement Blocks, White Plaster, etc. Freight rates and prices on application.

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MAKERS OF **Leather Belting**

BEST BELT FOR DAMP PLACES

SEA LION WATERPROOF LEATHER BELTING

ALMA Portland Cement

STANDARD BRAND OF MIDDLE WEST.

Specially adapted to all Reinforced Concrete and High-Class Work.

ALMA CEMENT CO.
WELLSTON, OHIO.

How do you figure your Lime Kiln, Rotary Cement Kiln and other furnace expenses and charges for Refractories?

By the cost of the BRICK, or by the length of the service they will give?

Harbison-Walker Refractories Co. { FIRE CLAY, SILICA, MAGNESIA, CHROME } **Brick**

Are made of the highest grade raw materials under expert supervision, in modern up-to-date works, and are worth more because better than others. They last longer and are more economical. You can prove this statement in your own works by sending us a trial order. Information, records and prices on request.

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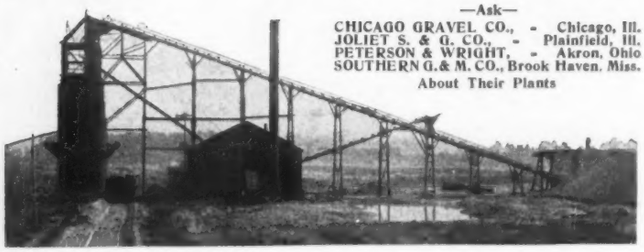

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High Tensile Strength, Finely Ground, Light and Uniform in Color.

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Strength Uniformity Satisfaction

A Dependable Portland Cement

An Unblemished Record for six years speaks for itself

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The Recognized Standard American Brand

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1,000,000 Barrels Annually

Highest Quality

THE BEST THAT CAN BE MADE

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On C. M. & St. P. R. R.
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CHICKAMAUGA CEMENT CO. — HYDRATED — PORTLAND — LIME — SOLE MANUFACTURERS — CHATTANOOGA, TENN. U.S.A.

IS IDEAL FOR

Waterproofing Concrete Blocks

SAVES MONEY. TRY IT.

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Rock Products

DEVOTED TO

Concrete and Manufactured Building Materials

Volume IX. CHICAGO, ILL., JULY 22, 1909. Number 1.

LATEST DEVELOPMENT IN SEWER CONSTRUCTION

Large Pipes Molded in Section Lengths of Three Feet and Reinforced With Triangle Mesh Wire Fabric.

With the greatly increased population of both cities and rural districts of the United States, one of the most important questions before the people today is that of the protection of their abode from danger and disease. It is the key-note of civilization.

The congestion of people in the large cities has brought up a very important question, and that is the provision for sanitation; as the dangers of conflagration have to be stamped out, so must the dangers of disease be provided against. It is as necessary to have proper drainage and sanitary conditions as it is to have fireproof buildings. Disease spreads as quickly through improper or the lack of sanitary appliances as it does by contagion.

We have all around us the city governments, working on different forms of water systems and drainage systems to improve those which are now in vogue and to invent better means. ROCK PRODUCTS has recorded the work of various municipalities in the installation of water purification plants that the source of water supply could be improved. Here rather than the drainage systems must the greatest attention be given, for "an ounce of prevention is worth a pound of cure." Recently the city of Louisville finished, after a continuous construction of ten years, a new city water system.

The city of Chicago for many years was troubled with the question of proper drainage. Until ten years ago the sewage of Chicago was carried into the lake. From this source of supply came the water for the city. Is it any wonder that the death rate of Chicago was so large? The very water from whence came the city's supply contained the refuse and waste of the population. It is miraculous that the city grew as it did. Sanitary experts and the medical profession advised the means of providing for this sewage which had contaminated the waters of Lake Michigan. This resulted in the construction of the Drainage Canal, which was one of the most important feats of engineering up until that time. By this canal, which ran from the city of Chicago to the Illinois River, the connecting link was made with Lake Michigan by means of the Chicago River. At the time the Drainage Canal was finished the course of the Chicago River was changed, and instead of emptying into Lake Michigan the flow of the river was reversed, thus carrying the water of the lake through the Chicago River, the Drainage Canal, the Illinois River, and emptying into the Mississippi River. By means of intercepting sewers, the sewage of this vast city was carried into the Chicago River. Since that time, the health of the people has improved, and the mortality has decreased proportionately, until today the city of Chicago stands as one of the healthiest in the United States. This has only been accomplished by the expenditure of millions of dollars, and with this important problem staring every city in the face, the most economical means of sanitation is one of first importance for consideration. The first requisite is to carry away the offal and waste by the construction of sewers that will be both serviceable and of sufficient capacity to provide for the natural increase of population.

THE WAUKEGAN (ILL.) SEWER, SHOWING TRENCH AND HOW THE REINFORCED CONCRETE PIPE IS HANDLED.

Time was when a wooden pipe was used, but that day has long since passed, and the clay brick has been the predominating element of sewer construction. With the introduction of concrete, this material has played a very important part in the last few years, until now no sewer is proposed unless concrete is first taken into consideration. We have the records of cities that used hydraulic cement some fifty or sixty years ago to build sewers which are today as strong as they were when first laid. Portland cement concrete has become the important factor in this line of work, because it is better from every standpoint than any of the materials known and used in the past.

With these various forms of construction naturally has come the question of the most economical. The smaller cities have taken up this question, for they have not millions of dollars to spend and still must provide for the health of their inhabitants in some form.

Casting concrete by means of forms in trenches has been the predominating method where concrete was used, and this has been found, and is today, the best under certain conditions. In trenches where the underground flow of water makes the operations difficult, other means of concrete construction have sprung up. Principal among these are the factory made concrete pipe, and to secure the best results a pipe reinforced with steel has been found by exhaustive tests to be the best.

(Continued on Page 46.)

POWER AND MINING MACHINERY COMPANY

McCully Crushers Lead

They Hold the Record in 1909 on Large Sizes. Other Makes Completely Over-shadowed.

Over Eighty Crushers Smaller Than No. 9 Shipped During Last Six Months All Over North America, to Europe and to Australia

Since November 1, 1909 we have built nearly all the large crushers sold in this country. The table below gives interesting facts regarding recent sales of large crushers.

	Number of Crusher	Size Stone Crusher Will Take	Size of Product Cubes		Number of Crusher	Size Stone Crusher Will Take	Size of Product Cubes
Dolese & Shepard - - - - -	Mammoth	42 in.x140 in.	6 in.	Meramec Portland Cement Co. -	10	24 in.x99 in.	5 in.
Woodruff & Pausch - - - -	"	42 in.x140 in.	6 in.	Monarch Portland Cement Co. -	10	24 in.x99 in.	5 in.
Hunt Engineering Co. - - - -	"	36 in.x130 in.	6 in.	Illinois Stone Co. - - - - -	10	24 in.x99 in.	5 in.
U. S. Government for Panama Canal Commission - - - -	"	36 in.x130 in.	6 in.	Allentown Portland Cement Co.	10	24 in.x99 in.	5 in.
Brownell Improvement Co. - -	11	27 in.x110 in.	5 in.	Three Forks Portland Cement Co.	9	21 in.x76 in.	4 in.
				Dolese & Shepard - - - - -	9	21 in.x76 in.	4 in.

DO YOU NEED FURTHER DEMONSTRATION OF THE SUPERIOR MERITS OF THE McCULLY?

Write for Catalog 4 R, "Machinery for Rock Crushing Plants."

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Sales Offices

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Hydrated Lime

Bulletin 30

THERE ARE INNUMERABLE GOOD REASONS

Why you should install [at once]

The Kritzer Hydrating Process

THE chief and principal reason is, because Hydrated Lime has proven to be of far superior merit—much more economical and effective than common lump lime.

¶ Most Architects, Masons, Contractors, Dealers, Corporations and Owners know this—others are rapidly acquiring this knowledge.

¶ Consequently, the great and steadily-increasing demand for Hydrated Lime—which has already so shifted and changed the trade conditions that even now lump lime appears in perspective as if it never had been more than an incomplete or half baked product.

¶ And inasmuch as the demand has greatly changed, the supply must also change.

¶ Hence, keen and ambitious Lime manufacturers are hastening to install the KRITZER HYDRATING PROCESS—to keep abreast of the times and save to themselves the business of a lifetime.

¶ We have expert engineers and practical men to design, build and equip a complete Hydrating Plant for you—exactly suited to all conditions and needs of your locality.

¶ We will START you RIGHT!

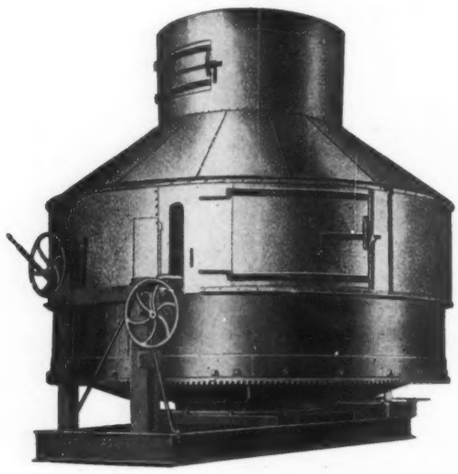
¶ We will develop for you the one system that will produce the greatest returns on your investment—so that success and prosperity will be assured you from the start.

It's Time Right NOW for YOU to Get Busy!

¶ For full particulars on "the most successful process," write

The Kritzer Company

115 Adams Street, - CHICAGO, ILLINOIS



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is the accepted standard of highest efficiency, economical operation, positive results and general all around serviceability in hydrating machinery.

There are more of them in use than all others put together.

They have proven their merit under all conditions.

We will furnish full information, booklets and interesting data on your request.

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The Quality That Never Fails

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Your Cement Needs Can Be Supplied Efficiently

Daily Capacity of 8,000 Barrels. Write today to

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ROYAL PORTLAND CEMENT

ABSOLUTE UNIFORMITY

HIGHEST STANDARD

DAILY CAPACITY, 6000 BARRELS

The best technical and practical skill, backed up by an experience of years, operating the most modern plant in the country on the highest grade of raw materials, justifies our claim that

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LET US QUOTE PRICES.

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High Tensile Strength
Light Uniform Color
FINELY GROUND

CASTALIA PORTLAND CEMENT CO.

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Plant: Castalia, Erie County, Ohio

Capacity: 2,000 Barrels Daily

Tell 'em you saw it in ROCK PRODUCTS

CEMENT SENSE

The **finest ground** Portland Cement is the best.

"Uniformity" means nothing unless it is uniformly ground.

"Color" means nothing essential except as an indication of fineness.

"Standard Ground" means nothing when compared with

Ash Grove Superfine Portland Cement

For **Ash Grove Superfine** is ground uniformly 10 per cent finer than Standard. Eighty-five per cent of this excellent cement will pass through the 200-mesh sieve. This means that users can

SAVE 20 Per Cent

at least by specifying **Ash Grove Superfine.** Write to us about it.

Ash Grove Lime & Portland Cement Co.
KANSAS CITY, MO.

Berkshire Snow White Portland Cement

BERKSHIRE WHITE PORTLAND "SNOW WHITE" TRADE MARK CEMENT

BERKSHIRE IS USED FOR ALL OUTDOOR AND INDOOR WORK WHERE A PERMANENT PURE WHITE EFFECT IS DESIRED

SOLD BY

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SOLE DISTRIBUTOR FOR

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Also for the CELEBRATED

WATERPROOFING COMPOUNDS

DEHYDRATINE
Damp and Water-resisting Paint. Waterproofs structures from cellar to roof.

SYMENTREX
(Liquid Concrete)
Beautifies and waterproofs brick and concrete surfaces.

HYDRATITE
This compound makes concrete impervious to water.

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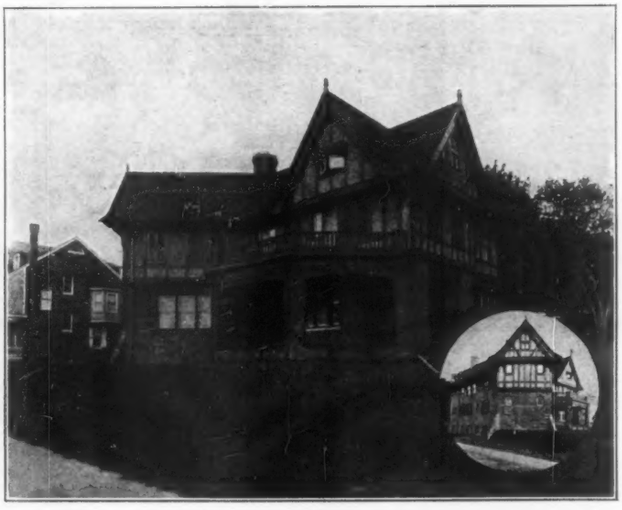

PORTER RESIDENCE, Boulevard, Wilmington, Delaware
WALTER STEWART BROWN, Architect

Sayre & Fisher Brick laid with one inch Mortar Joint.
All brick mortar and rough casting of :: :: :: ::

Nazareth Portland Cement and Limoid

For information concerning these materials write

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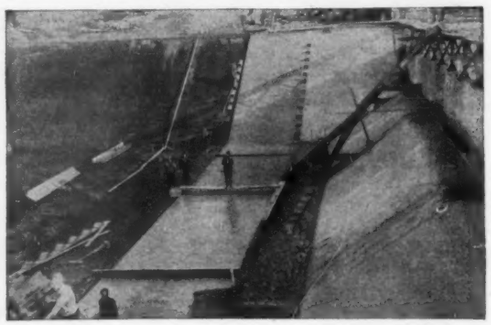
161 Devonshire Street, Boston, Mass.

WHITE PORTLAND CEMENT SANDUSKY PORTLAND CEMENT CO. SANDUSKY OHIO STAINLESS

Medusa Water-Proof Compound

Makes all Concrete Watertight
It Is Not a Wash

Illustration of Oil City, Pa., concrete reservoir which is being water-proofed with Medusa Water-proof Compound.
Write for pamphlet describing its use. Do not accept a



substitute, as there are many adulterated compounds on the market.

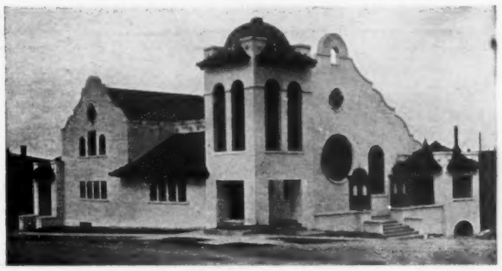
Sample of our Pure White Portland Cement sent on request.

Obtain our price on Medusa Portland. Annual Capacity 1,500,000 bbls

Sandusky Portland Cement Co.
SANDUSKY, OHIO

THAT THE CAPILLARY ATTRACTION OF CEMENT SURFACES CAUSES INCIPIENT DISINTEGRATION

has never been questioned. Is your building capillary positive or capillary negative? The best method of obtaining impermeability, uniformity and attractiveness is by the use of



Bay State Brick & Cement Coating

which fills the pores and gives a uniform color, thus doing away with the dull, monotonous blue gray of Portland Cement. THIS COATING IS FIREPROOF and bears the label of the NATIONAL BOARD OF FIRE UNDERWRITERS. Write for our book containing 100 illustrations, entitled: **"How to Decorate and Protect Cement Surfaces."** Free on application to

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French Buhr Mill Stones. Solids and Built.

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Bolting Cloths, Dufour Swiss Silk, Fine Wire Cloth.

Mixing and Sifting Machinery.

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The Perfect Waterproofing for All Kinds of Concrete Work

Thoroughly demonstrating experiments prove that this waterproofing preparation is the most economical and efficient thing of the kind ever offered on the market. It is permanent and constant in colors of the finished product, because it is made of natural materials of basic character that are unchanging. Permanent as the rock of ages. Quotations in any quantity.

Anhydrous Pressed Stone Co.

TELEPHONE MAIN 5278

134 Washington Street CHICAGO, ILL.

Your Concrete Waterproofed Without Additional Labor

Concrete, the modern material used in construction is unexcelled, provided it is waterproofed.

Un-waterproofed concrete is valueless. It absorbs moisture. It permits water to pass through it. This water and moisture freezes and expands. Thus, the concrete disintegrates.

Your concrete can be thoroughly waterproofed with practically no additional labor. AQUABAR will waterproof it.

A Bar Against Water

AQUABAR, as the name implies, is a bar against water. It is a colorless, paste-like solution.

AQUABAR is introduced into the concrete mass through the medium of water. Coming in two-gallon cans—one can of AQUABAR to each barrel of water—it does **not** require **skilled labor to thoroughly waterproof your concrete.** Being dissolved in the water, it comes into contact with every particle.

Seals Every Void

As the concrete sets, the AQUABAR crystallizes and becomes part of the mass. It completely seals the voids between the sand and cement.

AQUABAR slightly retards the rapid setting of the concrete, but does not decrease its tensile strength.

AQUABAR does not interfere with the ordinary construction or laying.

A Permanent Waterproofer

AQUABAR completely waterproofs a concrete mass for all time.

AQUABAR steadily improves with age. Its crystallizing properties becoming harder and harder.

Get These Two Booklets

If you are about to build a home, if you are an architect or a contractor, you should know the facts about waterproofing concrete.

We have two Booklets treating on this subject, which we want to place in your hands. Write us today for this information and prices.

Wisconsin Lime & Cement Co.

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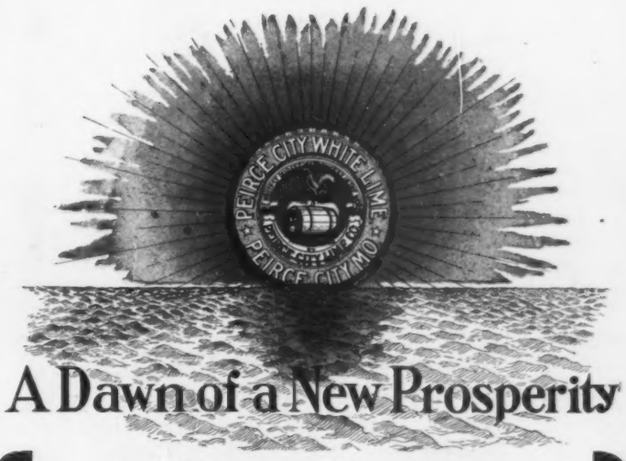
Manufactured by THE AQUABAR CO., Philadelphia, Pa.



A Dawn of a New Prosperity

PEIRCE CITY WHITE LIME

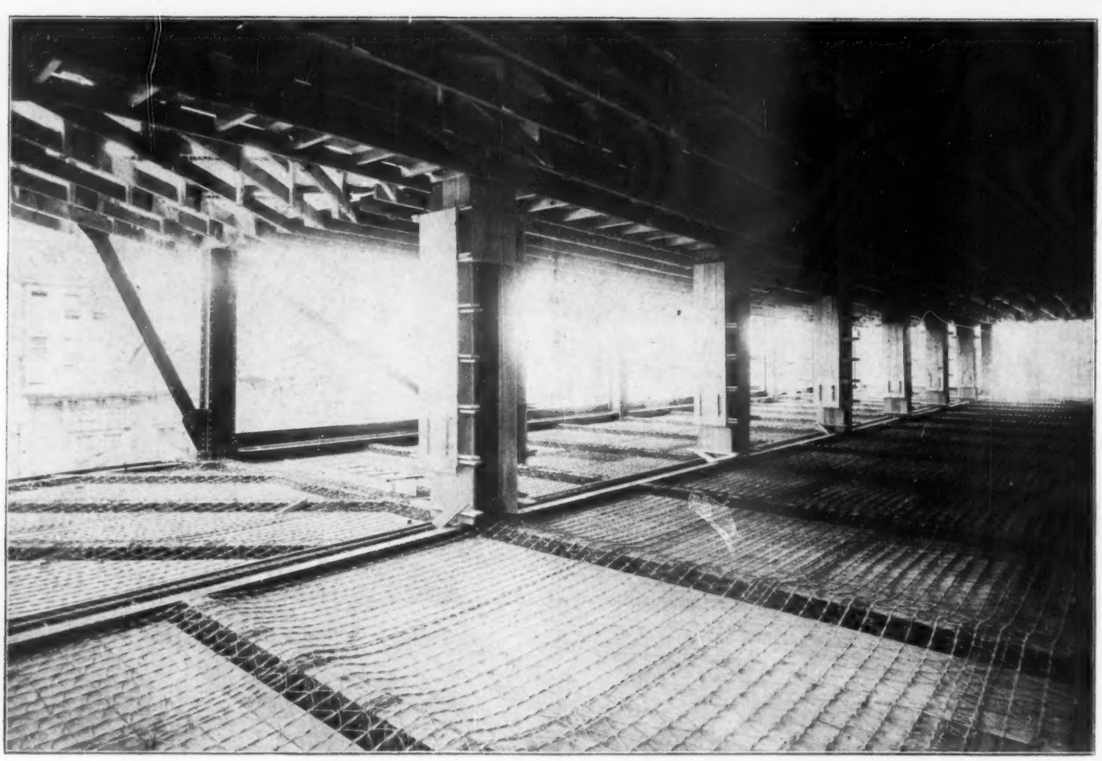
THE QUALITY LIME

Brings prosperity to those who buy it, because it is the whitest, purest and strongest lime in the world, and sure to give satisfaction. Our barrels are made of the best cooperage, bound by steel hoops that do not break. Write us at once for prices.

PEIRCE CITY LIME CO.

Peirce City, Mo.

Triangle Mesh Concrete Reinforcement



WHITE BLDG., SEATTLE, WASH. Built by Stone & Webster Eng. Co. Triangle Mesh Reinforcement Used.

Made by

American Steel & Wire Co.

CHICAGO, NEW YORK, DENVER, SAN FRANCISCO.

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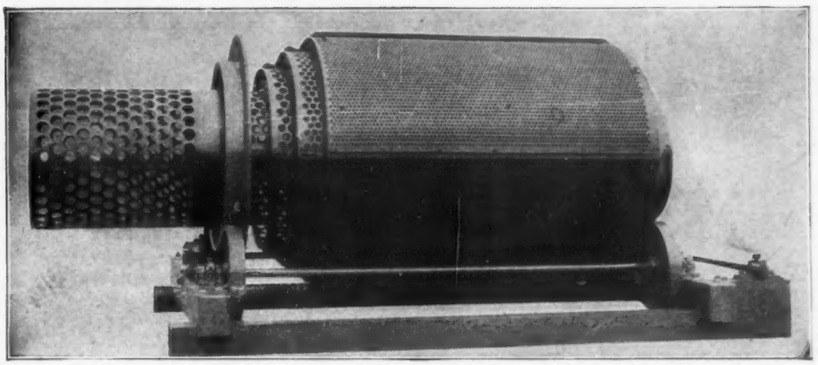
JOHN O'LAUGHLIN'S SCREEN



made solely by **Johnston & Chapman** is the

ONLY SCREEN

on the market for wide-awake quarry-men and miners, who want to separate crushed granite, limestone or other minerals, gravel, sand, coal or coke. It will soon earn its cost in saving of repairs, and maintenance, and reduced power, and will do more and cleaner work than any other cylindrical screen of like area. No one can afford to keep old traps in use when the **O'Laughlin** installed

NOW

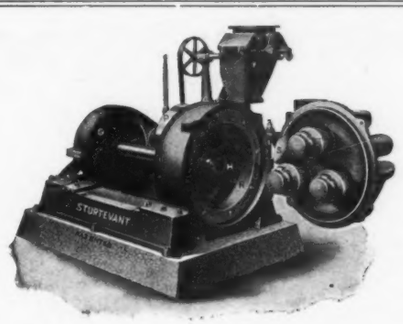
will from the moment it starts give a better and larger product, and a big interest on your investment in continuous saving in cost of repairs, renewals, and power. For particulars, address:

The advantages of these screens are described in detail in a circular which WE WILL MAIL TO ANY ADDRESS. Mr. John O'Laughlin, the inventor, has designed many notable improvements in rock-drilling, quarrying, crushing and screening machinery, and uses these improved screens in his own crushing plants, which others have declared "to be the most perfect in existence in every detail." The O'Laughlin Screen is an important factor in the most modern and perfect stone-crushing plant.

JOHNSTON & CHAPMAN CO.

1333 to 1345 Carroll Avenue, CHICAGO, ILLINOIS

Perforators of Sheet Metals, Flat, Cylindrical, and Conical Perforated Screen Plates for Quarries, Mines, Reduction Works, Mills and all Industrial Purposes.



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RING-ROLL MILL

working in connection with a

NEWAYGO SCREEN

makes the simplest and most economical rock-grinding plant yet produced.

Feed, 1½ inch and Finer. Product, from 16 to 100 Mesh.

SEND FOR CATALOGUES Nos. 77 AND 79 in which is shown its superiority in

ACCESSIBILITY
ECONOMY
EFFICIENCY

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New York
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→IN STOCK!!←

8-1½ YD. QUARRY CARS

For immediate shipment similar to cut below

36" GAUGE

14" WHEELS

These Cars are new all steel, equipped with self-oiling wheels and wood sub sill bumpers. Height 34" top of rail to top of car.

See catalogue No. 10-R for other types.

H. B. Sackett Screen & Chute Co.

4212-4226 State St., Chicago, Ill.

A few words from users of Amatite. We have hundreds of similar letters on file.

Laid one Amatite roof five years and one two years ago. Both in perfect condition today.

MAURICE H. BOWMAN,
Waterville, Maine.

Have handled Amatite for over three years and it has given perfect satisfaction.

JORDAN HARDWARE COMPANY,
Willimantic, Conn.

Find Amatite better than any other roofing I have ever used.

CHAS. DOLL,
Laurel Hill, N. Y.

Amatite is equally satisfactory in hot or cold, wet or dry weather. It fills the bill.

JACOB W. THORNE,
Nutley, N. J.

I tested five roofings for two years and found Amatite the best.

WM. F. FATTERALL,
Oakford, Pa.

Have never had a complaint from Amatite.

S. ST. J. GARDNER & SON,
Sholoha, Pa.

Tried two roofings for two years. One must now have coat of paint, but the Amatite looks as good as when first put on.

W. W. LABBOT,
Brunswick, Ga.

Amatite is better than shingles and does not cost so much.

HERMAN HALBESMA,
Summit, Ill.

I am glad I saw your advertisement and got Amatite instead of shingles.

J. E. HEIZEN,
Ransom, Kansas.

Amatite Roofing is giving perfect satisfaction.

KRUGER & KRUGER,
Cape Girardeau, Mo.

Have seen Amatite outwear tin roofs. It is all you claim and the best of modern roofings.

DOUGLASSVILLE SQUAB CO.,
Douglassville, Pa.

What better proof can anyone want?
Send for Sample.

Barrett Manufacturing Company

New York, Chicago, Philadelphia, Boston, Cleveland, Cincinnati, St. Louis, Pittsburg, Kansas City, Minneapolis or New Orleans.

MITCHELL LIME

Is Chemically Pure and Practically Free from Waste

The Strongest White Lime on the Market. Used and recommended by Sand-Lime Brick Manufacturers, Chemists, Soap and Glue Works, Plasterers and Masons.

Prices Cheerfully Submitted

Mitchell Lime Company

MITCHELL, :: :: :: INDIANA

Western Lime & Cement Co.

MILWAUKEE, WIS.

Sole Manufacturers of **LIMATE** The first and best Hydrated Lime in the market . .

In tensile strength for stone and brick laying and adhesive strength for plastering **Limate has no Equal!**

The thirteen lime plants of

Western Lime & Cement Co.

Have a total lime producing capacity of 10,000 barrels daily

Distributors of Best Portland Cements and Masons Building Materials. Correspondence respectfully solicited

Farnam "Cheshire" Lime Co.

OF CHESHIRE, MASS.
MANUFACTURERS OF THE

Celebrated Cheshire "Finishing" Lime

Well known throughout New York and the Eastern States as the finest finishing lime manufactured. The special feature of this lime is its quick and even slacking, thus preventing any cracking or checking when put on the wall. It is the best lime used in the country today for all

HIGH GRADE FINISHING WORK

Selling Department, 39 Cortlandt St., N. Y., C. J. CURTIN, Pres't.

The Ohio and Western Lime Company

WORKS AT
Huntington, Indiana
Marion, O.
Gibsonburg, Ohio
Fostoria, Ohio
Sugar Ridge, Ohio
Tiffin, Ohio
Genoa, Ohio
Limestone, Ohio
Lime City, Ohio
Portage, Ohio
Luckey, Ohio
Bedford, Ind.

MANUFACTURERS OF AND WHOLESALE DEALERS IN

Ohio and Indiana White Finishing Lime, Ground Lime, Lump Lime, Fertilizer, Hydrate Lime, Cement, Plaster, Hair, Etc., Etc.

MAIN OFFICE: Huntington, Ind. Branch Offices: Marion, Ohio.

Capacity 8000 Barrels Per Day

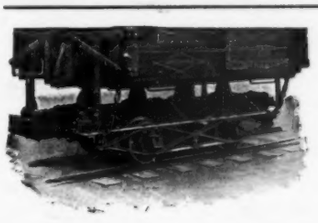
The Kelley Island Lime and Transport Co.

CLEVELAND, OHIO.

Tiger Brand White Rock Finish the best known and smoothest working Hydrated Lime manufactured.

WRITE FOR PRICES

THE LARGEST LIME MANUFACTURERS IN THE WORLD.



"CONTINENTAL" DUMP CARS

Our Dump Cars are used on most of the large rock and dirt moving operations throughout the United States and Canada.

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Continental Car and Equipment Co.
Works; Highland Park, Louisville, Ky. New York, 17 Battery Place

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Brown Hydraulic Lime, Austin Hydraulic Cement, Jasper Wall Plaster, Brick, Stone

CEMENT WORKS: Austin, Minn.
PLASTER MILL: Ft. Dodge, Iowa
WAREHOUSE: Minnesota Transfer

MANKATO, MINN.

HIGH CALCIUM HYDRATE

The Best for Every Purpose where Chemically Pure Lime Is the Indispensable Element

Sand Lime Brick Difficulties can be Simplified and Overcome by the use of our Correctly Hydrated Lime.

Cement Blocks can be made more waterproof, cheaper, and of lighter color by the use of from 20 to 40% of pure hydrate free from magnesia. This substitutes the same amount of cement and does not impair the strength of the block.

Finishing Lime As a finishing lime our Hydrate is unsurpassed. It is also a valuable addition to cement mortars, and for making mortar for brick and stone work.

Commercial and chemical requirements call for pure lime. We furnish a product of 98% analysis.

Kansas City **MARBLEHEAD LIME CO.** Chicago

SAVE MONEY, TIME AND LABOR

USE

Monarch Hydrated Lime

If Monarch Hydrated Lime wasn't better or cheaper than lump lime nobody would buy it. As a matter of fact it is both.

Monarch Hydrated Lime costs less delivered, can be thoroughly soaked in twenty-four hours, doesn't have to be screened, carries more sand, gauges with a third less plaster, spreads further and easier and will not air slack.

That's the whole story. Now try it. Compare the cost and the results with those of ordinary lime—and we have a new customer.

Monarch Hydrated Lime is made in Carey, Ohio, where the limestone is just right and the shipping facilities good. Our prices will satisfy you.

We also crush stone for all purposes.

THE

National Lime & Stone Co.

CAREY, OHIO.

Burton Powder Co.

MANUFACTURERS OF

Good Luck Dynamite

TRADE GOOD DYNAMITE LUCK MARK

AND

Blasting Powder

Dynamite Factory: New Castle, Pa.

Powder Mill: Quaker Falls, Pa.

Main Office, PITTSBURGH, PA.

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"IF IT IS **LIME** WE MAKE IT"

Lump - Barreled - Hydrated - Ground

STRONGEST IN OHIO.

We are not connected with any Trust or Combination.

WRITE US
PHONE US **The Scioto Lime and Stone Company, Delaware, Ohio**

PATENT SOAPSTONE FINISH

PLAIN AND IN COLORS FOR WALLS AND CEILINGS

Patent Soapstone Mortar

Prepared in any Color for Laying Pressed and Enameled Brick, Stone Fronts, Terra Cotta, Chimneys, Fire Places, Etc.

The Dodge Blackboard Material or Artificial Slate.

The Potter Blackboard Material.

SOAPSTONE MICA. CONCRETE DRESSING
CRUSHED, GROUND AND BOLTED SOAPSTONE.

AMERICAN SOAPSTONE FINISH CO

DODGE, Proprietor CHESTER DEPOT, VT.

NEW JERSEY LIME CO.

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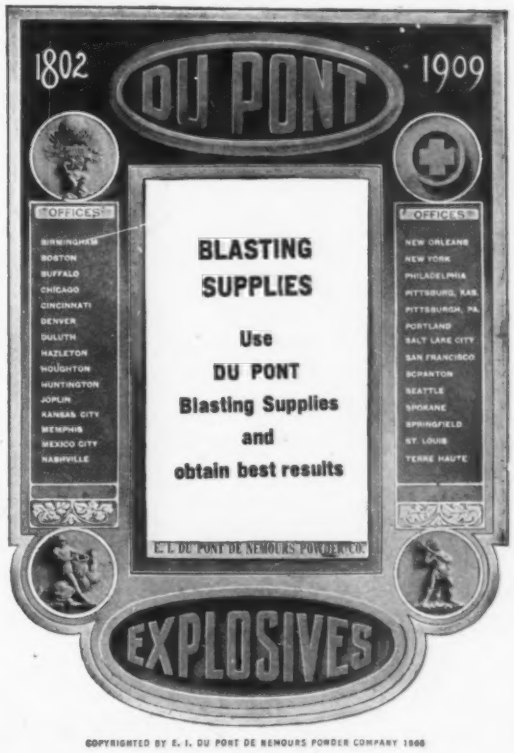
NEW JERSEY LIME COMPANY PLASTERING HAMBURG, N.J.
NEW JERSEY LIME COMPANY FINISHING HAMBURG, N.J.

HAMBURG, N. J. MANUFACTURERS OF McAFEE, N.J.

BUILDERS' LIME CHEMICAL LIME
HYDRATED LIME

HAMBURG, N. J.

Tell 'em you saw it in ROCK PRODUCTS



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The Standard Explosive
Always Full Strength
Always the Same

Send for new 66 page Blasting Manual

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XENIA, OHIO

Woodward Building
BIRMINGHAM, ALA.

The Bradley Producer

Gas Process for Burning Lime.

Four and three quarter pounds of lime to one pound of coal on a large output is now being secured every day.

Does that look like economy to you?

RESULTS GUARANTEED

Duff Patents Company Frick Building Pittsburg, Pa.

"THE ROOFING TILE WITH ARCHITECTURAL STYLE"

OLDEST

Concrete Roofing Tile Machinery

Manufacturers in United States

Europa and New Era
Concrete Roofing Tile

Handsome, Sanitary, Enduring, Economical

The crowning triumph of mechanical skill and genius

Costs less than any other Roofing Material, presents a much handsomer appearance; outwears all other Roofing.

Europa and New Era Concrete Roofing Tile, Showing Different Size and Form of Tile

Made in practical sizes; all colors; not affected by heat or cold; does not absorb the carbonic acid of the atmosphere; will not radiate heat. Lowers Insurance Rates. *The Manufacturing of Concrete Roofing Tile* is one of the most *profitable industries* in the country. We Build Roofing Tile Machinery. Information cheerfully furnished. Write for catalogues.

THE AMERICAN CEMENT ROOFING CO.

623 Columbus Savings & Trust Building COLUMBUS, OHIO

Tell 'em you saw it in ROCK PRODUCTS

If you are not convinced

by what you have heard as to the superior qualities of Nuttall cut or planed gears, just send us a trial order and be convinced.

Nuttall—Pittsburg

If in a hurry, wire us

THE FULLER ENGINEERING CO.

DESIGNING, CONSTRUCTING AND OPERATING ENGINEERS, ANALYTICAL CHEMISTS

CEMENT MILLS A SPECIALTY

OFFICES: ALLENTOWN NAT. BANK BLDG. ALLENTOWN, PA.

MACHINERY

FOR

Industrial Plants

We manufacture machinery for transmitting power, and for elevating and conveying materials in and about cement plants, rock crushing plants, lime plants, mortar works, plaster works, and other industries.

We manufacture screw conveyors, belt conveyors, and all sorts of chain and cable conveyors, for handling rock, lime, sand, etc.

We manufacture elevators, also, for handling the same kinds of material.

Our lines include shafting, couplings, bearings, collars, pulleys, gears, rope sheaves, sprocket wheels, elevator buckets and bolts, steel elevator casings, etc.

We have our own foundry, sheet metal department and machine shop. We employ first-class help in all departments and use high-grade materials.

When you are in need of anything in our line, try us.

Catalog No. 28.

H. W. Caldwell & Son Co.

17th St. and Western Ave., Chicago

Fulton Bldg., Hudson Terminal, No. 50 Church St., NEW YORK CITY

Do You Have Cars to Haul?

The Davenport Locomotive Will Save Money

Special Designs for Special Purposes

Any Size, Any Gauge, Any Weight

Write for Prices and Particulars

DAVENPORT LOCOMOTIVE WORKS

DAVENPORT, IOWA

Limestone and Shale

FOR MANUFACTURE OF

Portland Cement

ON THE

Illinois Central Railroad

IN THE

WEST AND SOUTH

Coal, Water and Good Labor

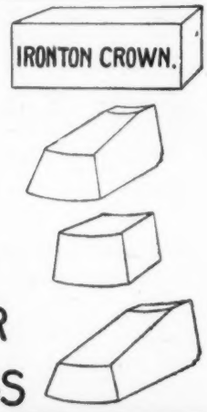
For Full Particulars Address

J. C. CLAIR, Industrial Commissioner

I. C. R. R. CO.

No. 1 PARK ROW, CHICAGO

ROTARY CEMENT LINERS.



LIME KILN LININGS.

GROUND CLAY FOR WALL PLASTER AND BOILER SETTINGS

DIRECT HEAT

DRYERS

FOR

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GLASS SAND
ROCK, CLAY
COAL, ETC.

All Mineral, Animal and Vegetable Matter.

We have equipped the largest plants in existence and our dryers are operating in all parts of the world. Write for list of installations and catalogue S. C.

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RUGGLES - COLES

DRYERS

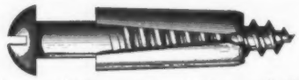
RUGGLES-COLES ENGINEERING CO.
NEW YORK CHICAGO

The Cummer Continuous Gypsum Calcining Process
See Other Advertisement, Page 64
THE F. D. CUMMER & SON CO. Cleveland, Ohio
Seven plants in successful operation producing about 1,500 tons per day.

THE WINANT COOPERAGE CO.
Staves, Hoops and Heading for Lime, Cement and Plaster Barrels
MILLS: Pennsylvania New York Maine Virginia Ohio
190 CEDAR STREET NEW YORK, N. Y.

"We are pleased to say that the returns from our Rock Products advertising have been very gratifying. Very truly yours,
N. J. Morehouse,
Waterloo, Iowa."
Extract from letter.

Farrington Expansion Bolts



The most secure fastening in concrete as well as in stone. Send for Samples.
H. Farrington, 45 Broadway, New York

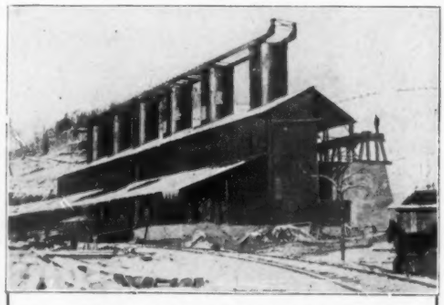
For Immediate Shipment—New and Rebuilt Machinery

One rebuilt Western Wagon Loader.
Gyratory and Jaw Crushers of all kinds and sizes.
One Steam Hoist complete with Cable and Derrick Irons.
Two 12 H. P. Russell Traction Engines.
One 30 H. P. Stationary Randall Engine.
One 12-ton Iroquois Steam Roller.
Headquarters for Sterling Wheel Barrows, Concrete Mixers, Rollers, Dump Wagons, Scrapers, Quarry and Gravel Pumps.

Write for Catalogues and Prices.

The Williams Contractors Supply Co.
COLUMBUS, OHIO.

C. K. WILLIAMS & CO.
EASTON, PA.
The Largest Manufacturers in the U. S.
BRICK AND MORTAR
COLORING
OF ALL SHADES
CORRESPONDENCE SOLICITED. SAMPLES AND ESTIMATES CHEERFULLY FURNISHED ON APPLICATION.



Lime Kilns and Plant of Blair Limestone Co., Canoe Creek, Pa.
Designed by
Henry S. Spackman Engineering Company
42 N. 16th Street Philadelphia, Pa.

ROCK PRODUCTS

ESTABLISHED IN LOUISVILLE, KY., 1902.

DEVOTED TO CONCRETE AND MANUFACTURED BUILDING MATERIALS.

Volume IX. **CHICAGO, JULY 22, 1909.** **Number 1.**

Publication day, 22nd of each month.

THE FRANCIS PUBLISHING COMPANY

EDGAR H. DEFEBAUGH, PRES'T.

Seventh Floor Ellsworth Bldg., 355 Dearborn St., Chicago, Ill., U. S. A.

Telephone Harrison 8086, 8087 and 8088.

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JACOB HOLTZMAN, 916 Rothschild Building, Philadelphia, Pa.

Communications on subjects of interest to any branch of the stone industry are solicited, and will be paid for if available.

Every reader is invited to make the office of Rock Products his headquarters while in Chicago.

Editorial and advertising copy should reach this office at least five days preceding publication date.

TERMS OF ANNUAL SUBSCRIPTION.

In the United States and Possessions and Mexico.....$1.00

In the Dominion of Canada and all Countries in the Postal Union..... 1.50

Subscriptions are payable in advance, and in default of written orders to the contrary, are continued at our option.

Advertising rates furnished on application.

Entered as second-class matter July 2, 1907, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879.

Drain tile is being used to a greater extent than ever before in the cereal growing sections. That is where a cement product has unquestionably helped some this year. There will be more of them used from this time on.

Again the sturdy farmer comes to the front and saves the country with big crops of corn and oats, and everything else that grows. Dilatory politicians have done their worst to make a botch of business, but the great West has never been touched.

Although there seems to be plenty of cement in sight for all reasonable requirements, there are more mills being projected and promoted. Perhaps the old principle of the omnibus conductor is still working: "There's always room for one more."

Factory-made sewer pipe, practically unlimited as to size, saving a large portion of the labor account ordinarily spent at the ditch, is the latest branch of concrete to be perfected. This economy will increase the mileage of this kind of work in every city and town. The requirements for effective employment of this class of municipal engineering is unknown.

Building operations have been well maintained in volumes in almost every market this season. Practically every man who handles supplies each month checks up larger business than last year. Yet there is an impression generally that this is an off year. Collections are slower than usual, and business men generally have a disatisfied feeling with conditions, but the facts and figures do not bear this out. Perhaps a little vacation would help some to cheer up the fellows who are really getting all the best of it.

In all the building code adjustment it would be a decided improvement to provide that all buildings intended for occupation as residences should use exclusively such materials as cannot burn. It is now entirely practicable to build such a house anywhere in the United States at a cost no greater than one built of combustible materials. Why not adopt and apply this one great improvement that has been needed for centuries, and now made available for the first time by the recent achievements of the Portland cement industry?

There are fewer concerns making concrete blocks, but better blocks are being made, and probably more of them than in any previous year. One feature is noticeable, with very few exceptions, real manufacturers of good building materials are running the industry now. Practical men who know how to make good at the building. Probably that standard specification of the National Cement Users Association has had more to do with this than anything else. At least the marked improvement of the product begun with the promulgation of that document.

The tariff tangle has grown into the tariff wrangle, and the national capital has become a summer resort for the politicians, great and small. No business man, however, is able to see where there has been any progress made by the operation. The revision is now being revised. The cost of the discussion to date probably necessitates additional revenue to pay for the expense of the long debate. Why not limit the pay of the debators according to results? If Congress was working on a piece scale of wages, just look what the country would have saved since last March!

The automobile has brought on a new road maintenance problem that is difficult to calculate. At the rate that they are being built, with the same amount of road distinction maintained, it is easy to see that in a very short time the entire road system of the country will be wiped out. It is estimated that 200,000 new machines will be built and sold within a year from July 1. The concrete roadway looms up as the only possible solution. Of course this will cost big money. So does the automobile. The only answer is to tax the automobile heavy enough to pay for the kind of a road that it makes necessary.

The opening of the lakes to the gulf waterway and the improvement of the internal natural water courses, as well as the rehabilitation of the old canal system that was once bravely begun by the fathers of the republic, is a live national question that is growing more vivid day by day. The time is not far off when a popular party, actually expressing the will of the majority of the people of this country, will swing into line with the slogan, "Cut out 75 per cent of the talk down at Washington and let us have some permanent visible evidences for the billions that are spent through the medium of legislation."

Western rivers are having their annual festival of havoc. In this period of arguing about conservatism of resources, natural and undeveloped, why not take up the matter of saving some of the already developed resources that are annually wasted? Perhaps the same board of government engineers that was sent to examine the Mississippi river, but reported on the operation of steamboats and other commercial matters instead, could be induced to produce an equally enlightening and acceptable report upon the control of the flood waters of the Kaw. Go to! is there not one hydraulic engineer amongst the bunch?

Cement plastered exteriors are gaining in popularity at an enormous rate. People who were satisfied with a barren brick wall a few years ago, are having these same surfaces treated with artistic lines, obtainable only by the use of a highly plastic material. Some color effects in blends and contrasts are very pleasing. The tonnage of this type of mortars consumed in the present season will show an increase of at least 500 per cent. Our travelers observe many places where one such job was pointed out one year ago that they are able to count twenty jobs at the present time. In one town the gain is seventy to one. This little straw shows the direction that taste is tending for future designers of popular work.

As fast as the bumper crops are harvested there will be a flood of money flowing to the country, and the late fall will find the farmer ready to build that barn, or that silo—fences, corn cribs and a whole lot of other improvements. Let's all pitch in to the campaign and increase the farm consumption of cement this fall by 200 per cent. It is easy, for to date there is about 50 per cent of a lead already developed. If every man with cement to sell in his warehouse will make it his business personally to push the concrete silo, the concrete barn floor, the concrete farm house, and every other thing that can be easily made of cement he will be surprised how fast his stock will melt away, and at the same time how fat that bank roll will grow. This is one good route to build up new business from now on. Don't hesitate to get in the game because you doubt your ability to give the right line of advice. Remember that ROCK PRODUCTS is on the job, and will get you whatever information you or your customers may need, if indeed it should happen that we do not have it on tap for your use.

EDITORIAL CHAT

It Pays.

When the dimpled baby's hungry, what does the baby do?
It doesn't lie serenely and merely sweetly coo;
The hungry baby bellows with all its little might
Til someone gives it something to curb its appetite;
The infant with the bottle which stills its fretful cries
A lesson plainly teaches—it pays to advertise.

The lamb lost on the hillside when darkness closes round
Stands not in silence trembling and waiting to be found;
Its plaintive bleating echoes across the vales and meads
Until the shepherd hears it, and, hearing, kindly heeds,
And when its fears are ended, as on his breast it lies,
The lamb has made this patent: It pays to advertise.

The fair and gentle maiden who loves the bashful boy
Assumes in his presence a manner that is coy;
She blushes and she trembles till he perceives at last,
And clasps her closely to him and gladly holds her fast,
And as he bends to kiss her and she serenely sighs
This fact is demonstrated: It pays to advertise.
—*S. E. Kiser.*

Bert L. Swett, of the Lehigh Portland Cement Company, came into Chicago the other day to line up a contract for out-of-town paving work. There is much paving going on in the smaller towns and with the hustling Bert on the job, Lehigh is specified in a good share of the contracts.

W. E. Cobean, sales manager of the Wolverine Portland Cement Company, Coldwater, Mich., was in Chicago recently calling on Wolverine customers.

Mr. Hunter, of the firm of Rubush & Hunter, leading architects of Indianapolis, is fighting tooth and nail the "Housing Law," which was passed by the legislature last March, on the ground of unconstitutionality. There is no more influential or better and persistent fighter in Indianapolis than he, who has the welfare of the city at heart.

Fred Goepper, of Indianapolis, Ind., is progressive in his ideas and is not afraid to experiment with new methods. Some little time ago he bought two auto trucks to deliver building material in the city and surrounding country. He had the satisfaction of finding that the automobile trucks worked to a charm and he may abandon the horse and wagon for delivery purposes altogether, substituting in their place the auto truck.

Horace Kimble, of the Kent Mill Company, spent several days in Chicago last week. He dropped in at the office of ROCK PRODUCTS and reported that business was very good with them, that he had taken orders for forty-six Maxecon pulverizers within one week. He also said that their foreign trade is excellent, as they have received a number of orders recently from Europe and from England. Mr. Kimble also sold two mills to Morris & Company, of Chicago, which are to be installed in their fertilizer works in Atlanta, Ga., for grinding phosphate rock.

All of Mr. Kimble's time was not devoted to business. He is a royal entertainer, knows how to order a dinner, but he can't play golf a little bit.

G. H. Calkins, sales manager of the Great Western Portland Cement Company, with offices at Kansas City, Mo., says their mill at Mildred, Kan., is running to its full capacity.

While in the R. A. Long Building, at Kansas City, a representative of ROCK PRODUCTS dropped into the Marblehead Lime Company's office and received the usual hospitable welcome by W. J. Stewart. Speaking of business, Mr. Stewart said that Marblehead hydrate continues in favor and the big plant at Hannibal is kept busy all the time. The dealers of supplies throughout the southwest are realizing the advantages of a product that is easily handled and does not perish. More dealers are adding this line to their stock every month.

Thomas M. Magiff, the widely known and ever popular sales representative of the Atlas Portland Cement Company, was a recent Chicago visitor. He has been busy for several months west of the Mississippi.

B. E. Allison, sales manager of the United Kansas Portland Cement Company, is one of the active and aggressive business creators at the great western cement center of Kansas City. He can cover more distance and never overlook a single bet amidst a big lot of engagements than most people, for the reason that he keeps his whole mind concentrated on the game all the time.

J. H. De Frees and Mrs. De Frees of Warren, Pa., were recently taking a little outing at Atlantic City. Mr. De Frees is one of those supply men whose business is so well organized that he can get away even in the busy season for a few days.

Percy H. Wilson, secretary of the American Association Portland Cement Manufacturers, has a number of useful pamphlets in course of preparation to assist the home talent cement users on the farm and in the smaller communities.

In spite of low prices and generally considered unfavorable business conditions the production and sale of Portland cement in 1909 will show an increase. Possibly 58,000,000 to 60,000,000 barrels.

Edward F. Kellie, formerly of Frankfort, Ind., is temporarily stopping at the Filbeck Hotel, Terre Haute, superintendending the equipment of the plant of the Sanitary Construction and Manufacturing Company of Terre Haute, of which he is president. This company will commence manufacturing on a large scale "Kellastone," a new plaster material for building houses invented by Mr. Kellie. He will make his home in Terre Haute when the equipment of his plant is completed.

J. B. Johnson, lately admitted to partnership of O. L. Jones & Company, one of the prominent firms dealing in building material in Greencastle, Ind., is a young man of great energy, and whose business ability and popularity in Putnam county are a valuable acquisition to the firm.

H. S. Husted, general manager of the Twenty-eighth street coal and building material yard of the G. W. L. Co., Indianapolis, has recently installed and completed one of the best and most perfect equipments for handling material of any yard in the country. The plan for these improvements were conceived by him and executed under his personal supervision have proved a success for which he has received congratulations.

C. L. Dilley of Logansport, Indiana, is contemplating some radical changes in enlargement of his business which will permit him to operate in building material on a much larger scale than in former years.

W. E. Harris, civil engineer who was formerly in the city engineer's office at Grand Rapids, Mich., in charge of construction work, has entered the coal and builders' supply field in Logansport, Indiana.

Mark Hayes, one of the old dealers in coal and sewer pipe in Crawfordsville, Indiana, is again on the streets after an illness of several months.

Wm. B. Morris, president of the Wm. B. Morris & Bro. Company, of Frankfort, Indiana, was the first man to handle and introduce domestic Portland cement in the ninth Congressional district of Indiana.

C. F. Schnaiter, who was born and raised in Martinsville, Ind., is a hustler from away back. He has an old head on young shoulders, does a large business in building material, has an interest in a feed and flour mill and elevator and is popular with all the farmers in the county, to whom he sells cement and feed and flour.

William F. Frey, one of the largest concrete and sewer contractors in Indiana, laid two hundred thousand square feet of concrete sidewalk in Lafayette, Indiana, last year.

Harry B. Warner, sales manager of the Maryland Portland Cement Company, like many other experienced operators in the cement business, looks for pronounced improvement in conditions at the fag end of the season.

Professor Edgar Marburg, the able and active secretary-treasurer of the American Society for Testing Materials, received many well-deserved expressions of appreciation for his inestimable services in the upbuilding of the influence and strengthening of the membership of the organization. Mrs. Marburg also exhibited rare talent as a speaker at the dinner. Both are immensely popular.

C. W. Boynton, of Chicago, and W. M. Kinney, of Pittsburg, representing the technical department of the Universal Portland Cement Company, participated, in the Atlantic City meeting of the American Society for Testing Materials, but they went home in time for the Fourth—probably engaged.

Albert Moyer, sales manager of the Vulcanite Portland Cement Company, and chairman of the "New Uses" committee of the American Association of Portland Cement Manufacturers, has a whole program of promotion up his sleeve on broad and strong lines.

Logan W. Page, director of the United States Office of Public Roads, and Richard L. Humphrey, engineer in charge of the Testing Materials Laboratory of the Geological Survey, have undertaken a competition, each to lay a sample stretch of improved highway, to bring out the merits of their respective ideas on that deeply interesting subject. The proper authorities at Washington have agreed to issue each of the engineers the necessary permit, and to act as sponsor for the friendly competition. Both of the gentlemen are eminent in their profession, and enjoy favorable national reputations. Their labors in the interests of discovering the best solution of the elusive problem of the best obtainable roadway in these days of automobiles will be watched with interest by the public generally, but by the road contractors in particular.

A. W. Munsell, chemist in charge of the inspection of materials at the operations of the Detroit River Tunnel, with Mrs. Munsell, was taking his vacation at Atlantic City recently. His inborn fondness for salt water was demonstrated every little while.

G. H. Charls, of Middleton, Ohio, has worked out a new type of metal lath which certainly has great practical value for both interior and exterior plastered surfaces. This lath has already been tried out in finished buildings, and has been pronounced a success on all sides.

H. J. Seaman, of the Atlas Portland Cement Company, had a small contribution on the side when strange methods and materials for reinforcing concrete were being discussed at Atlantic City recently. Probably many of the pioneer mill men in the cement field have seen worse than wire nails.

H. B. Lyman, one of the most prominent merchants in Lafayette, Ind., is an importer of Percheron draught horses from France. He keeps them on his two farms, which are highly improved and models in the farming district. One is situated seven miles northwest and the other nine miles east of Lafayette.

Announcements for the wedding of S. V. Peppel, chemical engineer, well known to many of the readers of ROCK PRODUCTS, to Miss Josephine Chandler, of Columbus, Ohio, are out. Mr. Peppel has recently connected himself with the King's Crown Plaster Company, of Cedar Rapids, Ia., which will be their future home.

When anyone sees the number 3840-Ill. on the rear end of an automobile these days they will know that Milton J. Williams, of the Williams Patent Crusher & Pulverizer Company, has just passed. It's a shame to have to walk on Jackson Boulevard and see three empty seats that look so inviting, but, alas! such is the fate of an editor.

A representative of ROCK PRODUCTS was in the new Finance Building in Kansas City the other day and dropped into the office of the Premier Clay Products Company. A. R. Dillon, secretary of the company, was in charge. He said that their plant at Oskaloosa, Mo., is nearing completion and they are now burning brick for their own use.

The Griscomb-Spencer Company, 90 West Street, New York City, has taken over the business of the Osborne Engineering and Manufacturing Company, and will continue to manufacture the well known Osborne air separator and pulverizers and other machinery formerly manufactured by that concern. The same high standard of workmanship and design will be maintained, which is the best guarantee of the high grade mechanical supplies which are known to the trade as the product of the Griscomb-Spencer Company.

Financial Diplomacy.

Hooray! Great achievement of American diplomacy, and especially Secretary Knox. The interesting and highly profitable privilege has been secured to American financiers to lend $10,000,000 at 4 per cent or less to the promoters of a Chinese railroad, with the security based on the value or earning power of the property when completed. The open door policy of China will be maintained—at least until all the American merchandise purchased with the $10,000,000 is delivered. In view of the well-known fact that every possible chance to invest money safely in this country at any such big profit as 4 per cent has been exhausted, this is very encouraging and should lead on to greater prosperity in the near future. The increasing burden of our well-known oversupply of capital, and the apparent impossibility of any one in this country employing any part of the same, has long been a menace to the public weal. Even though we know very little about Chinese credits this is grand diplomacy and good business, but let us hope that the American industries which really get the actual money will charge the same margin of profit usually taken from American consumers, so as to provide for any possible shortage of collections that may occur. By the way, would it not be a good thing to scare up another war between a couple of heathen nations in some out-of-the-way corner of the globe so as to get the opportunity to finance both sides of the contest? It would help to move out some of surplus, perhaps.

Faint zephyrs hovering over the ripening crops in the summer sunshine are already murmuring with impatience. Of such materials are cyclones made. The producers have stood for a lot already, but there is a limit somewhere.

Success of the Galveston Sea Wall.

A hurricane of quite as great violence as that which killed thousands of persons and wrecked every building in the city of Galveston in 1900 attacked that city July 21, without the loss of one single life in the city proper, and without greater loss of property than would have attended the storm had it struck any other city of equal size.

Galveston is now assured of its practical immunity from another disaster like that of nine years ago. A general feeling of confidence has resulted from the splendid action of the seventeen feet high concrete sea wall which surrounds the city on the gulf side of the island and which resisted the terrific onslaught of the sea. The sea wall stood the terrific beating of the sea backed by a hurricane producing a seventy-eight-mile wind like Gibraltar, hurling back the immense waves which shot the spray sixty feet in air.

This sea wall seventeen feet high and which surrounds the city on the gulf side is built of concrete. On the top of the wall is a wide boulevard, wide enough for driving six carriages abreast. When the engineer designed and built this sea wall grave doubts were expressed by scientific authority as to the practicability of the plan, and as to the strength of the material. It was feared that the work would be wiped out before terrific onslaught of the sea like that which formerly destroyed the city. Such a storm has transpired and it fully vindicates the design, the dimensions and the material. It is one more great victory for concrete as a material and for concrete engineering in such important structures. There are many cities of the seaboard sadly needing seawall protection of this very class. Now all such can proceed to make the needed improvements with all reasonable confidence.

New Chicago Clubhouse.

The Pickwick Country Club, a recent acquisition to the ranks of similar organizations of Chicago, is erecting a clubhouse of concrete construction on a section of its tract of 150 acres at West Lombard, Ill. The main building will be 550 feet in length, and will cover an area of eight acres. The rooms will number about two hundred altogether, and will include sleeping apartments, banquet halls, card rooms, thirty private dining rooms, a Louis XV ballroom, ladies' drawing room, lounging room, billiard hall, auditorium, swimming pool and gymnasium.

Walls will be moulded two stories high, and will be raised into place when hardened. The exterior design will combine the Italian villa type with Greek temple decoration, and pergolas, trellises and terraces will be conspicuous features on the east exposure. Several acres have been turned into an artificial lagoon, a large fountain being the dominant note in this feature. John Devereux York, of Chicago, is the architect.

The officers of the club are: James F. Pratt, president; John M. Glenn, vice-president; James H. Prouty, secretary, and William F. Van Buskirk, treasurer. Among the advisory board are a number of well known Chicago men: Frank E. Ballard, J. T. Brown, John D. Caldwell, George W. Dixon, John Farson, Sidney S. Gorham, Frederick W. Pringle, Judge Ben M. Smith, Clarence H. Thayer, Edgar B. Tolman and Fred W. Upham.

That the popularity of concrete in buildings of this kind is taking rapid strides there is no question. Many social organizations, notably the South Shore Country Club, of Chicago, have erected their homes of this material, and, judging from results, the satisfaction obtained is all that could be desired.

TO USE THE WATERWAYS.

Without Waiting For Further Improvements An Enterprising Concern Is Going Into the Transportation Business.

WASHINGTON, D. C., July 21.—Plans for a $10,000,000 river transportation concern are being discussed in Washington. Arthur N. Sager and J. L. Babler, St. Louis attorneys, acting, they say, for financial interests able to carry out the immense project of building a line of steel vessels and barges to ply the Mississippi and its tributaries, are interesting congressmen in the scheme.

William K. Kavanaugh of St. Louis, president of the Lakes to the Gulf Deep Waterway association, is to be president and general manager of the concern, which is to be called the Mississippi Valley Transportation Company.

The company proposes to have operating points at Chicago, St. Paul, St. Louis, and New Orleans, believing that a waterway which will give lake shipping an outlet by way of the gulf of Mexico is practically assured.

The wheat carrying trade between the upper Mississippi valley and the seaboard is the prize the new company is seeking. The fact that river transported wheat can be placed at New Orleans for not more than 8 cents per bushel, according to the promoters, tells the story of what the company expects. It is said to be impossible for railroads to take wheat to the seaboard for much less than 11 cents per bushel.

It is rumored that the board of directors of the new transportation concern will be made up of twenty-five members of congress and a like number of governors of states of the middle west, and shippers who now are leading spirits in the scheme.

The organization and progress of this concern will be watched with interest. Very probably the utilization of internal water transportation upon such a scale as is contemplated will have a direct bearing upon the early commencement of the great improvement schedule for the western rivers that has been needed for well nigh a generation.

Latest Base Ball Park.

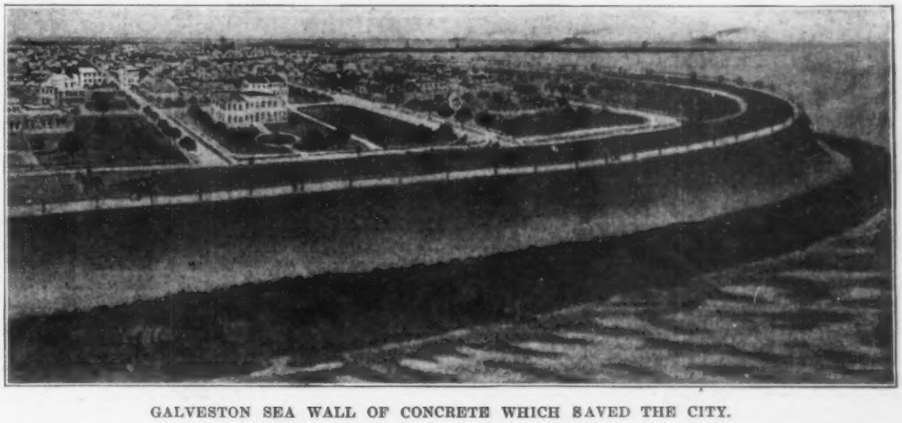
PITTSBURG, PA., July 1.—What is claimed to be the largest and finest baseball grounds in the world has just been completed for the Pittsburg club at Forbes Field. The first game was played yesterday between the Pittsburg and Chicago teams in the presence of more than thirty thousand attendants. The grandstand, the bleacher seats, the enclosure, in short every part of the $200,000 improvements is of concrete construction. The grandstand in particular is a very unique affair with three decks or stories for the accommodation of spectators. It was built on schedule time and is a credit to the general contractors, the Nicola Building Company of Pittsburg. This concern make a specialty of large concrete construction, and both design and carry such work on to completion. There are three concrete ball park equipments now in existence, Pittsburg, Cincinnati and St. Louis. Next!

Fischer Lime & Cement Co., to Build an Immense Warehouse.

The block bounded by Linden and Pontotoc Avenues, Walnut Street and the Southern railway tracks, owned by W. H. Seabrook and other heirs, was sold recently to the Fischer Lime & Cement Company, of Memphis, for $50,000. Eleven cottages are standing on the property. They will be torn down to make room for a mammoth warehouse of the company purchasing the property.

W. W. Fischer, president of the company, stated that work on the new building would start about the middle of August and be completed for occupancy in four months. It will cost over $75,000, and measures 125 by 400 feet, making it the largest warehouse and salesroom of its kind in Memphis.

The ground included in the purchase covers the entire block, having a frontage of 380 feet in Walnut Street and extending back to Linden Avenue, 468 feet. The company will give up its lease on the ground now occupied in the Southern railway yards on Adams Avenue. The present building will be torn down and the material sold.



GALVESTON SEA WALL OF CONCRETE WHICH SAVED THE CITY.

"We will have one of the most complete and labor-saving warehouses in the country," said Mr. Fischer. "Every device for handling our business will be installed, and the construction of the building so arranged that three railroad tracks will be built inside it, so that freight cars can be loaded or unloaded by parking them by the side of platforms. Our offices will also be in the main building, which will be absolutely fireproof and constructed of stone.

"We have been thoroughly satisfied with our present location, but on account of the city going to take over the old Southern yards for park purposes, we find it more convenient to move to the property just purchased, where we will still be in easy access to railroad tracks."

While Mr. Fischer did not intimate that he had received something definite in the way of information of the Southern moving from its present location, he admitted that there had been a "cog slip" somewhere that caused him to take advantage of his option.

The company has a branch office at the corner of South Cooper Street and Central Avenue.

Plenty of Concrete Rock In Chicago.

With all the mammoth quarry equipments in the south end of the city approaching completion, Chicago will soon be the best supplied place in the world with crushed rock, for ballast, for furnace flux and for concrete purposes. Within the next six months two big sources of supply for this kind of material will swing into operation—one at Gary, said to have the largest capacity in the world; another at McCook, on the drainage canal. These, with the large equipment already on the job in Chicago, should make this kind of concrete aggregate so plentiful and cheap as to materially promote the concrete industry.

F. J. Morse & Company, Chicago, write us: "We wish to be associated with you continually, and be able to keep in touch with the live topics always in your paper."

FROM OUR OWN CORRESPONDENTS

PHILADELPHIA.

PHILADELPHIA, PA., July 17.—Although there has been a slight falling off in the number of permits taken out for building operations during the last month, there is sufficient work on the boards and prospective to insure a prolific activity in building circles well into the winter months. It now looks as though the tariff ghost which has followed long upon the footsteps of the business man is about to be laid, and the large enterprises which are recognized as the commercial barometers are preparing to push business on the strength of it.

Prices in cement are still down, but there is a better tone in trading, and a noticeable inclination to stock up, as there is sufficient evidence, it is believed, that prices will before long begin to climb, and it behooves the conservative buyer to be under cover in time. Lime, sand and other building supplies have had a profitable call so far. The following are among the recent permits granted, and the work in process of execution:

Edwin S. Radley has purchased from John Dickey, Jr., the block of ground on the west side of Broad Street, from Lindley Avenue to Duncannon Street, and from Broad to Fifteenth Streets, comprising in all about five acres. On this lot Mr. Radley will erect 100 two and three-story houses, to cost $500,000. The houses on the Broad Street front will be built to sell at about $10,000 each.

Two hundred dwelling houses will be erected on a block of ground between Lehigh Avenue, Somerset Street, Twenty-third and Twenty-fourth Streets, by E. W. and J. M. Zane.

Solomon Greenberg has permit to alter the dwellings on the south side of Powelton Avenue, between Thirty-fifth and Thirty-sixth Streets, into a large flat house. The cost of the work will be $215,000. Other alterations necessary will bring the cost up to $300,000.

E. Allen Wilson will build ten two-story houses, including two stores and dwellings, at Eleventh and Pacific Streets, for George H. Backmire, at a cost of $33,000.

James M. Branagan has contract to build ten two-story houses, and three stores and dwellings, on Luzerne, between Franklin and Eighth Streets, at a cost of $25,500.

A. B. and C. F. Willett have contract for four stores and dwellings, each 20'x120', on the south side of Wayne Avenue, between York Road and Broad Street, at a cost of $6,000 each.

Ballinger & Perrot, architects and engineers, have completed drawings and specifications for an addition to the worsted and woolen manufacturing plant of James Lees & Sons Company, Bridgeport, Pa. The new building will be 202'x79', five stories in height. It will be of fireproof construction, with brick walls, columns, floors and roof of reinforced concrete construction, with slag roof covering.

The Philadelphia Leather Company has taken title from Thomas C. Foster to a plot 377'x575' at Tacony and Vankirk Streets, adjoining the present plant of the company, which will be used as a site for the erection of additional buildings.

Brooks & Wetherstine have purchased a plot of ground at the corner of Penn Street and Rubicon Avenue, upon which they will build eighty houses.

The old lumber yard of Thomas Williams, Jr., & Company, at the northeast corner of Eighteenth and Bainbridge Streets, has been sold to the Pennsylvania Company for Insurance on Lives for a nominal consideration. The yard covers an area of 307'x172', and it is understood will be used for a large building operation.

Schreiber & Steinhausen have bought a tract of four acres between Tabor Street and Somerville Avenue, and Fifth and Sixth Streets, upon which they will erect 100 two and three-story houses at a total cost of $400,000.

Five new bridges, which will open up highways either under or over railroads in the Thirty-eighth, Fortieth and Forty-second Wards, are about to be constructed jointly by the city and the Philadelphia & Reading and Pennsylvania Railroads, at a total cost of $300,000. Considerable concrete will be employed in these bridges, abutments and piers.

Oliver Randolph Parry, architect, this city, has awarded a contract for the erection of twelve handsome residences of different designs and plans, at Kennett Square, Pa., to Thomas F. Grady, of that place.

Cramp & Company have a contract from Ballinger & Perrot, architects and engineers, for an eight-story factory of reinforced concrete, 80'x14', at the southeast corner of Thirteenth and Callowhill Streets, for the Goodman-Loeb Company. Contract price, $200,000.

H. B. & A. C. Stevenson recently obtained permits for the erection of 140 two-story houses on Ringgold, north of Cambria Street, and on Taylor Street, to cost $198,500.

A permit was recently given to Doyle & Company for an eleven-story power house, 58'9"x101'8" and 29'x83'6", on Sansom Street, west of Sixth Street, for the Curtis Publishing Company, to cost $500,000.

David McKibben has purchased the plot of ground at the southwest corner of Second Street and Allegheny Avenue, 280'x250', upon which he will erect 100 dwellings to cost about $250,000.

Contracts were recently awarded for the construction of four main sewers, which will cost about $180,000, viz.: Gunners Run, Run Relief extension on Indiana Street, from its present terminus west of A Street, to Hancock Street, to Lombardi & Pascuzzi, for $50,000; Cottman Street, from the Delaware River to Tacony Street, to R. P. Bennis, for $32,000; Wissahicken High Level cutoff extension in Stokley Street, from present terminus, northeast of Roberts Avenue, to Ainslee Avenue, to David McMahon for $48,000; Shunk Street extension from Front to Fifth Streets, the Cantrell Construction Company, for $50,000. Special Market Street inlets, to Millard Construction Company, for $5,000.

The annual game of baseball between the Master Builders' Exchange and the Lumbermen's Exchange, for the benefit of charitable organizations, was played at the Pennsylvania Railroad Y. M. C. A. grounds on June 24. The builders for seven successive years have been the exultant victors in these games, and they evidently deemed it a foregone conclusion, that under their efficient captain, Benjamin K. Nusbaum, they would still continue to win the day and swim in glory, but they reckoned this time vastly without their host. They little suspected that George A. Howes, captain of the lumbermen, with his imperturbable smile and nonchalant air, had a star team at his back with which to tackle. From the very beginning the lumbermen strode triumphant, crowing loudly, to the score of 11 to 4. It was a keen game throughout, with fair treatment by Umpire "Rube" Vickers, of the Athletics. The rooters on both sides kept up a good-natured bantering, and all were magnanimously happy, for the most important consideration after all was that a good crowd had convened, which meant a round sum to be divided among the following noble charities: The Modified Milk Society; the Children's Country Week and the Red Bank Sanitarium. The line-up was as follows:

BUILDERS.		LUMBERMEN.
F. Mulvaney	S. S.	Robinson
Griffith	C. F.	Richardson
Byrne	3B.	Kugler
Graham	L. F.	Hyde
Dougherty	1B.	Hudson
Latta	2B.	Hanna
T. Mulvaney	R. F.	McCoy
Deal	C.	Gibson
Devine	P.	Olsen

Charles Elmer Smith, superintendent of the Master Builders' Exchange, states that most of the members of the Exchange are away on their vacations, but there is a constant stream of visitors to the exhibition department, however, informing themselves concerning the most modern material, appliances, cost, etc., undoubtedly with a view to building, which can but be regarded as a favorable indication of a much magnified activity in building work.

John B. Lober, Jr., of the Vulcanite Portland Cement Company, 1226 to 1228 Land Title Building, reports very busy, with outlook encouraging, but unfortunately, following a large accumulation of stock, prices refuse to stiffen, but a rise in values, it is believed, may be expected at most any time.

Charles Warner Company, 811 Land Title Building, states that in all building supplies except cement it is rushed day and night. In the latter material there is a lack of snap in trading. However, the outlook is promising. A. D. Warner, of this house, is on a few months' pleasure trip, touring Europe.

The Lawrence Cement Company, 616 and 618 Harrison Building, reports prices unchanged, but an increase is noted in the volume of cement moved of late. Mr. Johnson of this house says without doubt business is picking up, and the next few months ought to see a decided acceleration, with advanced prices.

Creditors filed a petition in the United States Court on July 9 to have the Thomas Engineering Company, of Allentown, Pa., adjudged as involuntary bankrupt. The names of the petitioning creditors and the amounts of their claims are: Philadelphia Electric Company, $4,198.55; Western Electric Company, $1,242.74; Pringle Electric Manufacturing Company, $240.15. David H. Thomas was appointed receiver of the company under a bond of $15,000.

The De Frain Sand Company, Philadelphia, was incorporated under Pennsylvania state laws on July 3. Capitalization, $400,000.

BALTIMORE DISTRICT.

BALTIMORE, MD., July 20.—The section centering around Baltimore, including Maryland, Delaware and parts of Pennsylvania and Virginia, continues to be the battle-ground of the cement market and has resulted in no improvement in prices.

Some of the largest firms, including the National Building Supply Company and the Maryland Cement Company, report the bulk of the business as satisfactory and a large number of orders on the books. Inquiries continue to be good and the demand is increasing. The builders seem to realize the advantage in building at the present time and in a number of instances, in the city, financiers have been persuaded to place their money in big operations just because of the low price of materials.

As a result of the low prices several firms here have had architects draw plans for warehouses to be mill constructed and later have them changed for fireproof construction. This means a better class of buildings for the city and has won much favorable comment from people interested. The Board of Fire Commissioners and insurance men are enthusiastic over the fine class of buildings being erected and are doing what they can to keep up the good work.

Besides the enormous amount of cement and stone being used in the building operations, thousands of barrels of cement and tons of stone are being consumed in the construction of the new $15,000,000 sewerage system and the Forest Park reservoir. Where the contractors are now working on the sewerage system the pipe which is constructed of reinforced concrete and brick is large enough for a team to drive through.

A material that is being shipped from here in large quantities throughout the Southern States and as far north as Pennsylvania is architectural terra-cotta from the plant of the Maryland Terra-Cotta Company, of which H. P. Boyd is secretary and treasurer. Mr. Boyd stated that the plant is running at its full capacity, and that there were more orders on the books of the company July 1 than there was during the whole of last year. The plant is running night and day and orders are still coming in fast. It is the only plant in this vicinity and the product is proving a great trade-gatherer for Baltimore.

An interesting report of the building operations in the city was issued a few days ago by Building Inspector Preston. Besides giving the regular summary for the month of June, it showed a list of the buildings erected since the first of the year and the cost. Two-story brick dwellings seem to be the principal need in the building line in the city and every month since the first of the year there has been an average of nearly 200 permits granted for such buildings.

William Ferguson and Brother, who secured the contract for the erection of the new office building and warehouse of the Standard Oil Company on Pier 2 of the city's new $10,000,000 dock system, are pushing the work rapidly ahead and expect to complete the building in contract time. The building will be a six-story steel, concrete and brick structure, 68'x100'. Because of the short distance from the water-front it was necessary to make the foundation of concrete piles, which were driven to a depth of about thirty feet. The steel work, which is being furnished by Lauer & Harper, of Westport, is finished up to the fourth story. The Roebling Construction Company is doing the fireproofing and Lehigh Portland cement is being used. The building will be completed about January 15 of next year and will cost about $120,000. The architects are Haskell & Barnes.

Charles L. Stockhausen has received some of the largest contracts given out in the city in the past two months. He is now busily engaged on the two five-story warehouses at the northwest corner of Light and Pratt Streets. The one facing on Pratt Street belongs to Egerton Brothers, wholesale grocers, and the one fronting on Light Street will be known as the Reiter Building. Both structures will probably cost $180,000.

The contract for the erection of the new car barn and terminal station of the Maryland Electric Railways Company, which was described in ROCK PRODUCTS last month, has been awarded to J. Henry Miller and the construction will begin in a few days. The

building will be erected at the southeast corner of Druid Hill and Fulton Avenue and will be leased to the United Railways and Electric Company to be used as the Druid Hill Park terminal of five street railway lines. The building will be constructed of steel and concrete. It will be 197'x472', two stories high, and will cost about $250,000. The architects are Baldwin & Pennington.

John E. Marshall and Son have been awarded the contract for the erection of the $30,000 residence of Mrs. James M. Maslin at 1304 and 1306 St. Paul street. The house will be a concrete, brick and marble structure, 27'x115'. The interior will be handsomely decorated and finished in hardwood. Tile baths and the latest plumbing and fixtures will be installed.

Walter E. Burnham has been awarded the contract to build a four-story fireproof warehouse at 121 South Street, on one of the few remaining lots in the burnt district, for Joseph W. Neily. The building will be 36'x76' and will cost about $25,000.

CHATTANOOGA, TENN.

CHATTANOOGA, TENN., July 16.—Building supply firms here, of which there are a great number, report a first class July business. There are in the Chattanooga territory large lime works, large cement works and many clay and rock crushing companies. ROCK PRODUCTS' correspondent, in a skirmish over this territory, finds the trade in a high degree of optimism and barring a little cement war in this municipality everything is lovely at this season.

The city of Chattanooga has awarded the contract to the Southern Paving and Construction Company, First National Bank Building, here at $25,500 for asphalt resurfacing and new asphalt paving on Georgia Avenue, Eleventh Avenue and Columbia Streets.

Chattanooga showed a larger per cent of gain in building operations in June than any other Southern city, the gain over June, 1908, being 150 per cent. Gains are shown in the following Southern cities: Richmond, 146 per cent; Louisville, 94 per cent; Dallas, 57 per cent; while in the following there were losses: Baltimore, 21 per cent; Atlanta, 7 per cent; New Orleans, 2 per cent; Birmingham, 64 per cent; Mobile, 4 per cent.

Sloan & Co. had an application made in the courts here against the city's limiting the municipality in certain ways in purchasing cements to be used in city work but this application is now withdrawn as the city makes the field an open one for all comers with cements. Considerable interest had been aroused by this litigation.

The Acme Box Company, in building its new factory this fall in Chattanooga, contemplates a concrete structure.

Work has started here on Betterton & Martin's Hotel, which will cost about $40,000.

The Keith Hotel, corner of Market and Union Streets, is having an annex built to it. Geo. A. Collins, contractor and builder, will do the work on Betterman & Martin's hotel.

The Gager Lime Company, which has sales headquarters in the James Building here, reports a very good normal trade on lime. The management stated that their kilns at Sherwood, Tenn., among the most extensive in the state, were in about steady operation.

Architect R. H. Hunt, of this city, has received orders for plans for the erection of clinical laboratory for the Agricultural and Mechanical College of Mississippi at Starkville, Miss. The building is to be a fireproof structure and will cost $60,000. Mr. Hunt is also preparing plans for remodeling the court house at Scottsboro, Ala.

The Chickamauga Quarry and Construction Company, of this city, has amended its charter, raising the capital stock from $15,000 to $20,000.

The University of Chattanooga, H. S. Chamberlain, president, will build a $20,000 residence for the president of the university.

The Board of Public Works, H. F. Van Dusen, chairman, will build a large $100,000 sewer and will expend $25,000 for smaller sewers with the proceeds of an issue of bonds.

The Reicon Company, of Knoxville, Tenn., with branch office at Johnson City, Tenn., is developing a nice business on reinforced concrete engineering. They have planned considerable work that has been executed this season in upper East Tennessee.

The Fulenwider Building Material Company has been incorporated at Birmingham, Ala., with a capital stock of $3,000 by A. L. Fulenwider, Robert Fulenwider, E. V. Pope and John T. Strickland.

A company has been incorporated at Ocala, Fla., to establish a lime plant. Those interested in the same are: A. G. Gates, Stephen Jewett, John A. Graham, all of Ocala; C. M. Carn, Reddick, Fla., and others.

NASHVILLE AND THE SOUTHEAST.

NASHVILLE, TENN., July 15.—Quite a fine amount of building is going on in Nashville this summer and more is in prospect for the autumn. While never boastful, the contracting firms express satisfaction as conditions unfold and hope for even better things when the tariff fight is adjusted and normal conditions are restored in eastern trade centers from where everything is gauged. The close competition here makes prices an uncertain factor just now.

Bids will be asked for and contracts made for the work on the construction of the new Y. M. C. A. and Y. W. C. A. buildings on Seventh Avenue North, next week, according to a statement of the state secretary, W. Walters McGill. Harry H. Hussey, of Chicago, is the architect. The Y. M. C. A. Building plans are now in conformity with the change in the size of the lot to make room for the Capitol Boulevard. Instead of being six stories in height, the building will be seven. The tearing down of the old buildings on the site has been practically completed by the contractors, E. T. Lewis & Co. Foster, Creighton & Co. will start work on the excavations soon.

A concrete structure soon to be erected in Nashville will be for the Portland Egg Case Company, of Portland, Ind., which has secured a site in West Nashville at Fifty-fifth Avenue and Charlotte Road. A factory of concrete construction 50'x100' will be erected. The concern is now located at Portland, Ind. The local manager will be A. P. Rice.

The Foster-Creighton-Gould Company has secured the contract for much of the work on the new Y. M. C. A. and Y. W. C. A. buildings.

The Concrete Construction Company, of Nashville, will finish this week the reinforced addition for the Tennessee Packing and Stockyards Company and will also finish the reinforced summer dining room and roof garden for the Elks Club.

The Nashville Bridge Company here has one of the most convenient office buildings in the South occupied solely by this firm and standing on the banks of the Cumberland River, near the new bridge. The building is six stories, of concrete construction. The firm has only been in same a few months.

Hunter McDonald, with offices in Stahlmann Building, is the general manager and engineer in charge of the Cummins Station addition, authorized by the directors of the Wholesale Merchants' Warehouse Company. The construction is practically a duplicate of the present building, being reinforced concrete, faced with red brick. The structure will cost about $150,000.

Architects Thompson, Asmus and Norton have prepared plans for a three-story addition to the clubhouse of the Watauga Club.

The Nashville Concrete Company reports a number of jobs in hand now and others in prospect for autumn.

The Harley Pottery Company will have their fire brick plant in operation this month. A quantity of new machinery has been installed.

Lightman, McDonald & Company, contractors, have completed the foundations and elevator pits for the new addition to Cummins Station, and will begin work next week on the superstructure. This is the largest reinforced concrete building job that has been let in Nashville since the building of the original Cummins Station. W. M. McDonald has gone to St. Louis to hurry up shipments of the steel for the reinforcements on this building.

The Nashville Concrete Company has begun work on building a reinforced concrete undergrade crossing the Moresville pike at Columbia, Tenn.

Gov. M. R. Patterson has called a State Good Roads Convention for early September. Reports from many engineers will be heard and a state commission to report to the next legislature will be created. It is more than probable that the result of this organized effort for good roads in Tennessee will mean a system of macadamized or graveled roads in many counties.

The Foster-Creighton-Gould Company has just completed a bridge for the Louisville and Nashville Railroad, near Goodlettsville, Tenn. They are also building a bridge across the Santee River at Ferguson, S. C.

President Warner, of the Nashville Railway and Light Company, has purchased a carload of finely ground Kentucky asphalt, which he will have laid upon certain parts of the traction company's right of way with a view to experimenting with the new material in repairing their part of the streets on either side and between the tracks. The Wadsworth Stone and Paving Company, of Pittsburg, Pa., from whom this car of asphalt was purchased, control a mine of the rock at Pittsburg, Ky., a point on Green River some distance above Bowling Green.

Phillips & Buttorff Manufacturing Company have secured the contract for the slate roofing on the residence of L. J. Shorter.

R. T. Creighton, president of the Foster-Creighton-Gould Company, has been spending some time at the company quarries at Rockwood, Ala.

C. W. Rives, building contractor, reports work plentiful in his line.

Polk & Kannady, plastering contractors, have secured several nice contracts.

Webb & Allen, of Nashville, have secured the contract to grade and macadamize streets and construct two concrete bridges at Third and Fourth Streets, Scottsville, Ky.

The number of new structures in process of construction at Nashville or in contemplation is gratifying to the building trade. The million dollar Hermitage Hotel is nearing completion of the steel work. Large homes are to be built for the Y. M. C. A. and Y. W. C. A. A building especially designed for a doctors' office building is to be erected by the Parkes Building Company. A very handsome new bank is being completed.

A $100,000 structure for office and other purposes is to be erected by Vanderbilt University.

The Concrete Construction Company, Noel Block, reports an exceptionably good business for July.

R. L. Cash Company, 925 Prospect Avenue, Nashville, are making some concrete blocks and report very satisfactory conditions of trade this summer. They do all sorts of concrete construction.

Curtis & Lesueur were awarded the contract for laying sidewalks on Seventeenth Avenue, by the Board of Public Works.

The Nashville Roofing and Paving Company, 602 First National Bank Building, are finding a summer of activity on cement sidewalk, cellar floors and gravel roof construction.

The Nashville Concrete Company has begun work building a reinforced concrete undergrade crossing under five railway tracks crossing the Moresville pike at Columbia, Tenn.

R. L. Cash & Company have secured the contract to build a concrete block wall 150 feet long and three feet high for E. W. Calloway.

The Broadway bridge at Nashville, across the Cumberland River, has been completed and is a thing of beauty and utility. The bridge was designed by Howard M. Jones, a Nashville engineer, and was constructed by Foster-Creighton-Gould Company, of Nashville. In design it is strong, metrical and artistic. It was opened with a formal programme several days ago after having been in process of construction for eighteen months. Gov. M. R. Patterson was not able to be present, but sent a felicitous telegram from Union City, Tenn. The municipal authorities of Nashville took part in the programme. The cost of the bridge proper was $475,000. Grand total, including right of way, approach, etc., was $567,000. The length of the bridge and approaches is 3,250 feet. The concrete trusses are thought to be the highest of that character of any in the country.

The Agerton and Robertson Roofing Company report a good business in slate, gravel and composition roofing.

George M. Ingram, president of the Bitulithic Company, has been at Gadsden, Ala., to submit bids on paving in that town. The company was successful in securing contract for paving from the municipality of Birmingham, Ala.

The Nashville Bridge Company has secured a contract to place a reinforced concrete roof on the Blair flats, and is also putting a roof on the Fletcher Hotel at Gallatin.

The Nashville Bridge Company has just closed the contract for the erection of a new bridge on the Winchester and Decherd Boulevard.

The Foy Construction Company of this city is placing the final span on the Jefferson Street bridge across the Cumberland, and it will be thrown open in a few days.

Bids have just been opened by the Board of Public Works at Nashville for placing a uniform concrete coping and sidewalks on the widened Eighth Avenue, between Broadway and Church Street. The lowest bidders were William Leftwich for the sidewalk; Agathen and Robinson for the coping and sills, and J. T. Allen for replacing the cut stone coping in front of the High School property.

The Nashville Bridge Company has contracts for building bridges in North Carolina, Mississippi and Tennessee. Mr. Ross of this company states their business last month was over double that of any month last year.

The Builders' Exchange of Nashville is to have a new home in the Noel Block. The entire third floor of the Noel Block is being remodeled for the Exchange and it will be ready for occupancy very shortly, although the exchange will not remove from the Stahlmann Building until January 1 next.

Plans are on file at the Builders' Exchange of the new postoffice buildings to be erected at Paducah, Owensboro and Bowling Green, all in Kentucky.

Plans are being prepared for a $30,000 edifice for the Russell Street Presbyterian Church and a $25,000 home for the West End Presbyterian Church.

The Warioto Cotton Mills have planned an addition and the secretary and treasurer, J. B. Morgan, is to advertise for bids. At Lebanon, Tenn., the Lebanon Woolen Mills are to expend $75,000 in the erection of an addition.

The Board of Public Works of Nashville has introduced a bill providing for total expenditure of $55,550 for paving various streets in new territory, including North Clay, McFerrin and Fifth Streets. William W. Soythgate is city engineer.

MEMPHIS AND THE SOUTHWEST.

MEMPHIS, TENN., July 15.—The usual midsummer quiet period has prevailed here the last week or two, but gratifying building figures were shown for the first half of the year, being almost a quarter of a million dollars above the figures of the year before. There are indications on top of this that the coming six months, owing to specially large jobs, will exceed the first half of the year. The first part of July, though, on building materials has been nominally quiet. Some of the supply firms make complaint of the summer quiet, but most everyone has a strong confidence in trade conditions for the coming months.

There were constructed in Memphis during the first half of this year buildings valued at $1,845,066, as against $1,620,555 up to July 1, 1908. At least two skyscrapers are in prospect for the remainder of the year. The building of the proposed union passenger station at Memphis, which it was thought would have been actively begun by this time, has been delayed indefinitely by the refusal of the Louisville & Nashville and the Nashville, Chattanooga & St. Louis railroads to agree to pay equal portions of the interest on the $5,000,000 mortgage, upon which the necessary funds were to be raised.

J. C. Lovelace, vice-president and general manager of John A. Denie's Sons Company, 82 South Front Street, Memphis, referring to the present situation, said to ROCK PRODUCTS representative: "Our midsummer business is fully up to our expectations. We are moving large quantities of cement, plaster and lime. The only complaint we have is that collections are somewhat slow, although plenty of business is offered. So far as our personal doings are concerned, we are trying to keep as quiet as we can in this excessive hot weather."

John A. Denie's Sons Company were established in Memphis in 1867, and so are among the pioneers in the state. They are manufacturers of Alabama and Tennessee lime. A short while ago the official directorate of the company was somewhat revised and it now stands thus: C. A. Denie, president; P. J. Johnson, sales agent; J. C. Lovelace, vice-president and general manager; Robert L. Appling, warehouseman; Frank Chambers, secretary and treasurer, and W. D. Watson, traffic manager.

The Fischer Lime and Cement Company, of Memphis, said: "Business here is only fair. The market in every line is shot to pieces. There is, though, a great deal of big work in prospect, but nothing very much going on just now."

At a special meeting of the Memphis Park Commission just held a contract was awarded to James A. Omberg for sixteen concrete bridges to be built on the park drive. This includes all the work of this character to be done, and will cost in the aggregate about $14,000. There were three bids, M. Larkin and the Clark Construction Company also being bidders for the work. The Omberg bid was for the sum of $16,000, but a deduction is to be made on the Overton Park bridge for the part of the work already completed.

The W. P. O'Keefe & Company Ornamental Cement and Block Works, in East Memphis, are doing some building work over the city and their product is meeting with favor.

The American Lumber Company, 103-4 Porter Building, with yards at Cooper Avenue and Belt Railway, this city, has gone to handling concrete blocks, sand, cement, rubber roofing, etc., in connection with building materials of a woodworking character.

The Pidgeon-Thomas Iron Company, twenty-five years established in Memphis as a hardware and mill supply house, is handling now considerable gravel and rubber roofings and a few other building specialties.

The Memphis Granolith Company, located at McLemore and Rayner Avenues, are putting on the market extensively now the McDaniel grave vault. It represents a good concrete product and is proving popular in Memphis and elsewhere.

Memphis is making a herculean effort to secure the location here of the West Tennessee Normal School, to be established by the State of Tennessee somewhere in the western division. Two hundred thousand dollars has been donated by this city and county, and a popular subscription of $100,000 is now being raised.

S. M. Neely, president of the Tri-State Fair Association here, has made arrangements for the erection of a poultry and pet stock building at the fair grounds. The building will be 300 feet long with varying width and will have accommodations for over 3,000 coops.

The National Plaster and Material Company has awarded the contract for the erection of a plant in Memphis, to cost $27,000.

For general manufacturing purposes, Chas. Loridanz, of Atlanta, Ga., will erect a building here ten stories and basement, 100x100 feet. Concrete construction. Each floor to be leased to different manufacturing plants. Contract let to Southern Ferro-Concrete Company, main offices Atlanta, Ga. The cost will be $100,000.

An unsuccessful attempt has just been made to arrange the local matters of the John Pierce Company, of New York, who built the million-dollar courthouse here, now about completed. It was desired that the company could continue in charge of the work. A conference was held between J. W. Canada, counsel for the Pierce Company; H. H. Barker, Percy Finlay and Albert W. Biggs, representing the creditors who have filed claims in the local suit; Lamar Heiskell, receiver, and the courthouse commission, with a view to having the receivership ended and the Pierce Company put back in control of the situation. The creditors are said to have agreed to allow the receiver to be discharged, provided the courthouse commissioners would agree to guarantee the payment of the last 15 per cent of the amount due on the subcontracts, but this is where the negotiations fell flat, as the commissioners would not bind themselves to this payment. They took this position on the ground that their contract with the Pierce Company made it necessary for the money to be paid to the Pierce concern.

W. B. Troy, gravel contractor and supply man, has recently opened an office in the Byrd Building, corner of Main and Madison. Mr. Troy is interested in gravel pits at Perryville and points in Decatur County. He has completed a number of important street jobs in West Tennessee the last few months.

The Camden Gravel Company, of Camden, Tenn., is developing a fine pit of gravel near that town. A spur track has been built out on the Nashville, Chattanooga and St. Louis Railroad from that point to the pits.

Hurlburt Bros. will erect a $12,000 business building here.

The H. P. Striecher Company has been incorporated at Memphis with $25,000 capital stock. The incorporators are H. P. Streicher, Arthur Weller, Guy Culver and others.

The Continental Artificial 'Stone Manufacturing Company has been incorporated, with A. Trailot, president and general manager, and A. K. Haynes, secretary.

Mayor Jas. H. Malone announces that the city will improve Monroe avenue and East Cocke Place, construct four concrete culverts and concrete deck to bridge on Adams Avenue at Bayou Gayosa.

Contracts for three brick school houses have been let by the building committee of the County Board of Education here. Two of the new buildings are to contain six rooms and the third only two. The two large buildings will cost about $6,000 and the small one about $1,000. The building committee is composed of Chairman Miller and Messrs. Craig and Thompson.

Ground has been broken at Brownsville, Tenn., for the new three-story brick store house which is to be erected by Forrest & Dupree, hardware merchants. The building will be modern in every detail and will cost about $15,000.

The contract for the erection of the West Tennessee Experiment Station at Jackson, Tenn., by the State was let to W. A. Kirby, of Jackson. His was the lowest of six bids, the highest bid being made by D. M. Crawford & Company, of Memphis. The contract calls for the completion of the building by November 1.

Koehler Bros., contractors, 68 West Court Street, Memphis, report that they have several good paving contracts on hand. This firm also does reinforced concrete work.

The Fischer Lime and Cement Company, of Memphis, will erect a new warehouse to accommodate increasing business.

The Boyd estate of Memphis has awarded the contract to Albert Whiffen, of Memphis, to erect a warehouse, four stories, brick, with concrete foundations and gravel roof. Cost $21,000.

Chas. T. Fincham, 324 Moore Building, San Antonio, Tex., will install a complete crushing plant to crush limestone for concrete.

Secretary of State Goodloe has granted a charter to the Exchange Building Company, of Memphis, Tenn., with a capital stock of $650,000. The incorporators are: John S. Williams, S. T. Rease, H. J. Parish, C. W. Butler and B. H. Ashner. This is the company that will build the new skyscraper in Memphis.

CHICAGO

CHICAGO, July 21.—This month conditions in the cement trade show an activity which is gratifying to everybody in the business—a condition which was inevitable to come with the greater demand for cement usual at this time of the year.

Prices are stiffening and the tendency is decidedly upward. The mills are running full capacity and selling all they make, accumulating no stock. Further, it must be remembered that last spring prices reached a lower level than had ever been known in the history of the cement trade. The demand for cement is increasing by leaps and bounds every year and still close observers realize that its use, large, and perhaps it is not exaggerating to say enormous, as it is today, is but in its infancy.

A new customer has entered the cement field in the last few years who bids fair, in the course of comparatively a few years, to use as much cement alone as the entire yearly consumption of cement is today—and that customer is the farmer.

The agricultural department of the Government is giving him significant attention, sending its bulletins broadcast to farms, which are educational in their character in the use of cement. The Association of Portland Cement Manufacturers put on its first man to travel from farm to farm to photograph, sketch and describe the uses of cement on a farm.

This new customer has already become an important factor in the trade and will, after harvest time this fall, greatly increase the demand of former years, all of which will have a strong tendency to an advance in prices for cement.

The dealers in sand and gravel are doing a much heavier business than they ever did in former years, and the prices are lower than ever known since the time of beginning, which reaches farther back than the memory of man. There is a tendency, however, of higher prices, brought about by the greater demand at this time of the year, and the probability of the usual shortage of cars.

Plaster tonnage is more than good and prices are more than bad. This condition, it is believed, will not change soon, on account of the number of new mills and no business, who, in order to get it, sacrifice prices.

William Dickinson, sales manager for the Marquette Cement Manufacturing Company, with that cordiality and pleasing manner which has attracted hosts of friends to him, said: "Business is very good this month, the market is a little stronger than it was a month ago, and a still further stiffening of prices is seen coming with the period of the year when there is always a much heavier demand, to which this year will prove no exception. I expect no skyrocket movement in prices, but feel confident that the upward tendency will continue."

"Business has been good with everybody here, although no very large contracts have been closed recently," said J. U. C. McDaniel, sales and traffic manager of the Chicago Portland Cement Company, who pleasantly took time from his work to give the following concise and clearcut statement of what was going on in the cement field: "Prospects were never brighter, as new conditions give promise of a much greater use for cement than has been experienced in past years. As an instance of these new conditions the association of the Portland Cement Manufacturers have put on a man last week to travel from farm to farm to photograph, sketch and describe the uses of cement on the farm. Prices are stiffening and the heavy demand usual to this period of the year will have a tendency to increase prices, which are very low, compared with former years."

"Prices for cement are lower than they have been for years and must go up, is not only my opinion, but that of every man in this trade," was the way H. F. Treadway, sales agent of the Peerless Portland Cement Company, sized up the conditions of the trade. "The demand has been good this month, and business has been better, our mills are running full tilt and we are shipping it as fast as we are making it and not accumulating any stock. The demand for cement at this time of the year is always very heavy, and there is a perceptible tendency upward in prices. In my opinion the low prices of today will not be seen again in years to come."

"The German-American Portland Cement Company has shipped more cement by far than last year," said Edward L. Cox, its general sales agent, "and the tendency of the market is towards an advance in prices, which are lower than they have been in years and will be in years to come. We look for a heavy business in the next ninety days and have all we can

do to take care of our trade and fill contracts during that time. Local trade is good."

"The demand for our product in the Northwest and Southeast is very good, and the prospects exceedingly bright for the future," stated E. J. Winslow, president of the Hydrolithic Cement Company. "Our western mill has not been able to supply the western market, but we will now begin manufacturing our product at our new mill next week at La Salle, Ill., which has a capacity of 1,000 barrels per day of hydrolithic cement, which will give us the needed facilities to supply the western demand. There is a defined tendency towards better prices."

P. M. Richardson, president of the Richardson Sand Company, said: "We have been busy all year; we have all the business we can take care of and prospects look exceedingly bright. We have the contract supplying the City Railways Company with sand and gravel and supply the country trade, which is large. The demand has been heavy in towns of any size in Illinois."

Parker M. Lewis, of the American Sand and Gravel Company, said: "Prices are lower than they have been in years, but the prospects are that they may stiffen up with the busy season now upon us and the possible shortage of cars. That there is more sand and gravel handled this year than ever before and this company is doing more business this year than any year in the past, and the same is true of all the other concerns dealing in sand and gravel."

"Our mills are turning out more cement than we claim as our output," said J. P. Beck, of the Universal Portland Cement Company. While they have not taken on any large contracts lately, they have a steady demand from their regular customers and the work they have on hand.

LOUISVILLE.

LOUISVILLE, KY., July 16.—Building is on the increase in Louisville, and as a result things are looking up considerably. There has been a lot of work in prospect all along, and now that some of these prospects are actually being materialized the situation has been greatly improved. Some of the big jobs which have either been let or will shortly have contracts awarded are the coagulating basin of the Louisville Water Company; the half-million-dollar plant of B. F. Avery & Sons Company, in South Louisville; the First Christian Church, the Tyler Hotel, the Walnut Street Theater, the Fetter printing plant and the Luna Dome Theater. While not a great many residences are being built, several unusually handsome ones are to be erected, and the amount of concrete porch work that is being done is very large.

The building report for June showed that while only 256 permits, as compared with 277 for the same month of 1908, were taken out. They represented an expenditure of $384,234, compared with $198,178 for June, 1908. That made a gain of 94 per cent. For the first six months of the year there was a gain of 20 per cent, and with the big building propositions referred to above likely to develop in the building records at any moment, the situation from that standpoint may be regarded as very good.

The cement situation is fair, with much reinforced concrete construction ahead; the contractors are figuring on a lot of big jobs and the architects are busy; the roofing and supply people are being kept on the jump, and wall plaster is in fine demand. Sewer pipe has shown some improvement, and fire brick is in better demand than it has been. Building brick is in good demand.

There have been exceptionally heavy rains which have continued almost without intermission for several weeks, and this has kept back work a good deal. The weather seems now to have settled down, and unless the rains begin again the contractors and builders can go ahead. Meanwhile, work has been piling up so that the rest of the summer is sure to be a busy one, even if comparatively little new work develops.

General Manager Horner, of the Kosmos Portland Cement Company, indicated that business is good by saying that he had just closed a contract for 25,000 barrels of cement to be used in the local sewer work. The Vincennes Bridge Company has bought 2,500 barrels from the Paducah Kosmos agents, Barry and Henneberger, for use on two concrete bridges there. The demand for cement, said Mr. Horner, is fair, but the bad feature of the market is the fact that prices are very low. C. M. Timmons, sales manager for the company, is out on the road now, and the big plant at Kosmosdale is once more turning out cement at full capacity.

Business is pretty slow just now, said Henry Gray, of J. B. Speed & Co. There are a good many pretty good prospects, he said, but all of them are not ready for figures yet. "I'm not going to take my vacation immediately," said Mr. Gray, "because when business is dull we have to hustle for what little there is. When it's brisk we can go away and let things run themselves for a while."

George F. Meldrum, of the Utica Lime Company, said that the rain had a bad effect on business, but that prospects are good and business is now fair. The Utica Lime Company is the local agent of the Lehigh Portland Cement Company. This concern has been making big strides in the local market recently, getting the cement end of the contract for the water company's new basin. A. N. Struck, of Louisville, was the general contractor, landing the job at $104,642. There were six applicants for it.

J. H. Ohligschlaeger, of the National Concrete Construction Company, said that things are looking up decidedly. His company is finishing work on a reservoir for the Louisville Lighting Company, which is used in connection with their big plant at Fifteenth and Magazine Streets. The reservoir is of reinforced concrete, a line of columns through the center, to support the pipes to be used in the spray system adopted by the lighting company, being reinforced. The basin is 120'x100'. The National is about ready to begin work on the new reinforced concrete saw-mill of the Richland Parish Lumber Company at Rayville, La. Mr. Ohligschlager is figuring on the new Avery plant, for which there is a lot of competition. There are twenty-six buildings to go on a site nearly 1,200 feet square, and the estimated cost of it is about $500,000. There will be a reinforced concrete office building and a big warehouse of the same type of construction, while there will be an immense amount of concrete foundations and footings. The other buildings will be of brick. The contract for this work will be let about July 22. The National people will also figure on the lighting and refrigerating plant of the Fetter Lighting Company, which will be of reinforced concrete and will cost about $200,000. D. X. Murphy & Bro. are drawing the plans now.

E. M. Wintersmith, of the Central Concrete Construction Company, said that business has slowed up a little of late, though the latter part of June was very active. Most of the work they are doing just now, he said, is ornamental in connection with residences, and consists of columns, balustrades, etc. The rain has made it necessary to stop outside work, but Mr. Wintersmith hopes to begin again immediately. The fine new Caperton residence is one of those upon which he is working.

Vice-President Streicher, of the National Roofing and Supply Company, said that they have been moving along well and have been particularly busy on roofing. He is using the output of the Barret Manufacturing Company in the roofing line, and said that this is giving fine satisfaction. The National Roofing and Supply Company is also doing considerable cement work, the Tatum and Middleton residences, on Cherokee Road, being some of the principal points of operation. A big porch of concrete is being put all around the Tatum mansion.

The Southern Roofing and Paving Company, according to Secretary J. B. Pace, has a lot of work on hand, with good prospects, but has been much hampered by the rain. "If it rains as much in the next forty-five days as it has done in the past forty-five," said Mr. Pace, "I don't know what we shall have to do."

B. J. Campbell, Jr., president of the Kentucky Wall Plaster Company, has been nominated for alderman on the Democratic municipal ticket. They said around at the plant that they thought the old man would gallop in. John Campbell said that business had been good all summer, and that the rain had not interfered, as it had made inside work the only thing possible. The company is doing a lot of effective local advertising.

Poor collections are the worst feature in the business situation as reported by the Atlas Wall Plaster Company. Business otherwise is all right. Though there is not much building that interests them, prospects are fair, they reported.

Business is picking up with the Ohio River Sand Company, which has two diggers at work and is getting out more sand than ever before in its history. The sewer work and the Avery plant give promise of taking a large part of the output of the company. There is a good business out in the state, eight or ten cars of sand and gravel being sent to Lexington and other interior cities nearly every day. John M. Settle and Capt. Duffy, of the Ohio River Sand Company, were spending the day up with the diggers when the ROCK PRODUCTS man was at their headquarters.

T. Bishop, of the Southern Brick & Tile Company, which manufactures a building brick, said that they have been busy right along, and that prospects are fine. The plant is running at full capacity, and about half of its output is being shipped and the remainder used locally. Mr. Bishop looks for even heavier business in the next two or three months.

Burrell & Walker are finding the sewer pipe proposition a little easier right now, according to F. R. Walker, a member of the firm. He said that the Owensboro plant of the company has been turning out a good deal of pipe, and while not as much of it has been used on the sewer work here as he would have liked to see, still a good quantity has been consumed in that way. As soon as the tariff discussion is ended and money gets a little easier, Mr. Burrell said, business ought to be much better than it is now.

K. W. Grahn, of the Louisville Fire Brick Works, said that there is sure to be a big improvement in business in the next few months. "We are so closely affected by the steel and iron industries," said Mr. Grahn, "that as soon as there is a revival of activity with them we will feel it. Their mills and furnaces are not running now and of course the demand from them is very light. In spite of this, however, we are doing a fair business, much better than last year, in fact. We look for a big improvement before the summer is over."

The Kentucky Unit Brick & Tile Company is to put up a plant in Louisville. The company has one now in Charlotte, N. C. It manufactures a concrete brick, and Mr. Van Arsdale, their local representative, said that machinery had been bought for the local plant and that it will be in operation in sixty days. They have secured the contract for the brick to be used in the construction of Luna Dome, the new open air theater to be erected here. The company has filed articles of incorporation with the county clerk, showing that it has a capital stock of $90,000. S. D. Adkisson, L. R. Jeffers and D. Price Van Arsdall are the incorporators of the company.

A good many people that ROCK PRODUCTS is interested in have become charter members of the Bureau of Industries, a new branch of the Commercial Club. They include the Kosmos Portland Cement Company, J. B. Speed & Company, the Central Concrete Construction Company, the Kentucky Wall Plaster Company and the Hydraulic Brick Company. The Bureau is to bring new factories to Louisville.

The filter plant of the Louisville Water Company is now in operation. It started working July 4, and, according to unofficial statements, it is a success. The water which comes out of the faucets is certainly clear. Work has been going on for about ten years, and was started by Charles Hermany, chief engineer of the company, who died about two years ago. All of the buildings in connection with the filter plant are built of concrete. Webster Gazlay, associate engineer of the company, who has been on the filter job for nearly two years, will retire as soon as it gets into good working order and take up his place with the National Concrete Construction Company, which he left to go with the filter construction work. Charles P. Weaver, former mayor of Louisville, under whose administration work on the filter plant was begun, has proposed a banquet to celebrate the completion of the task.

The Sewer Commission has let two more contracts. The Ferro Concrete Construction Company, of Cincinnati, will build Section A of the Northwestern Trunk Sewer for $30,000. Four other firms competed for the contract. C. T. McCracken Company, of Columbus, got the contract for the Section B of the South Louisville branch of the Southern Outfall sewer. Eight companies entered bids, and the McCracken people got it at $80,000, $33,000 lower than the highest bid.

The H. B. Towles Concrete Company is making a cement post which is meeting with good success. The post is reinforced with four strands of barbed wire. Farmers and land owners around Louisville are buying it in good quantity, it is stated. They are sold at a price about half that of wood.

The State Board of Control of Charitable Institutions has decided to build septic tanks at the institutions under its management. These will be used for purifying the waste of the hospitals. One will be built immediately at Hopkinsville. It will be constructed of concrete and will cost $1,500.

The Builders' Exchange of Louisville has issued a year-book. The book contains an interesting discussion of contract and building work, together with the names of the architects and contractors of the city. The Builders' Exchange recently held an interesting meeting between the subcontractors and the general contractors, with the end in view of bringing these divisions of the building field closer together.

A non-sinkable concrete dock has been launched at Owensboro, and the inventor says that it is the first of the kind ever built in America. The dock is built on a frame of iron, with thirty air-tight compartments four feet in depth. These are subdivided by partitions of reinforced concrete. A barge of the same construction is the next thing to be turned out by the Daviess county phenom.

C. C. Mengel & Bro. Company are planning a concrete vat for storing mahogany veneer flitches. It will be twelve feet deep and 8'x40'. The company will construct the vat with its own men.

R. B. Slaughter, a sand contractor, died at his home here a short time ago. He had been in Louisville for many years and was well known among the building contractors

THE NORTHWEST.

MINNEAPOLIS, MINN., July 14.—The Northwest bids fair to break all previous records with reference to building records this year. The Twin Cities are making brave showings on their totals, both by comparative months and for the first half of the year. New work is constantly developing, so that the second half will be by far the largest of the year. All contractors are busy, and general building looms up on every side. The construction is better apportioned among the different materials than has been the case in years gone by, and nearly all classes are having their share of the business. So far, labor has been free from threatenings of trouble, although there have been some minor mutterings, and in one instance a wage raise was granted.

The number of conspicuous blocks in the downtown districts being erected of pressed and enameled bricks and terra cotta is larger than usual. There are large buildings and also a great many small ones being erected of glazed and enameled brick, and the number of small structures which have fronts of this class of materials is larger than ever. White sand lime brick comes in for a good deal of attention and is being used freely in flat buildings, stores and others.

Concrete construction is holding up well, and the number of reinforced concrete structures, if not so conspicuous of the larger buildings, is more than made up by the greater number of smaller structures. Prices of building materials are somewhat inclined to strengthen, under the better conditions which are prevailing.

The Minneapolis friends of Fred H. Chapin (and they are many) are glad to learn of his promotion by the Hydraulic-Press Brick Company, from the St. Louis office to fourth vice-president of the company, with headquarters at Cleveland.

Granulated slag has been utilized for a macadam paving in Duluth, with good results.

The Luverne (Minn.) Cement Block Company has begun manufacturing nests for hens of concrete. The nests are claimed to be much better in that they do not harbor vermin, and the latter can be burned off without damaging the nests.

Building totals for St. Paul for the first six months of 1909 aggregate more than $5,000,000. During June there were permits issued for a total of 192 dwellings, while in the month there were permits issued aggregating $1,709,189 as against $641,755 for the same month of a year ago. The city issued from January 1 to July 1, 1,041 permits for homes. Building Inspector Cunningham expects that the total for the year will reach $12,000,000 or more.

Minneapolis had the banner month in permits for June, with one exception, issuing permits for $2,338,515. The one exception was in December of 1888, when a permit was issued for the court house and city hall and for a twelve-story office building, which ran the total up to $3,585,716. June of 1908 had a total of $877,000.

C. A. P. Turner, the Minneapolis civil engineer, is about to issue a book on reinforced concrete construction, and expects to be able to mail it by August 1.

The Shevlin-Carpenter Lumber Company, of Minneapolis, has recently taken the agency for the Medusa Portland cement, as well as for the white cement of the same company and for the waterproof compound. The company will also handle lime and plaster as well.

Master plasterers of St. Paul have granted a raise of wages of fifty cents, from $4.50 to $5 a day, conditional that the men agree not to engage in contracting on their own account.

The Landers-Morrison-Christenson Company, building material dealers of Minneapolis, has secured a tract in South Minneapolis and proposes erecting another warehouse, which will be the fourth in the city, all being located on trackage.

The American Business College, of 732 East Lake Street, Minneapolis, has let the contract to John Engquist to erect a pressed brick and cut stone building at Lake Street and Nicollet Avenue, to be two stories and basement, 60x80 feet. Cost $30,000.

J. C. Famechon & Co. will erect a three-story warehouse at Twelfth Street and Highland Avenue, Minneapolis, 44'x120', of white sand lime brick. Cost $20,000. G. L. Saxton, architect.

Moore & Scriver, furniture dealers, Minneapolis, are having plans prepared for a handsome new store building to be erected at 810-812 Nicollet Avenue. It will be four stories, 63'x100', pressed brick and cut stone walls, reinforced concrete fireproof construction interior. Cost $40,000. Cecil Bayless Chapman, architect.

W. O. Clark received the general contract for a portion of the Park Avenue Methodist Church, Minneapolis, at Thirty-fourth Street and Park Avenue. The building complete will cost about $40,000.

Buechner & Orth, architects, St. Paul, prepared plans for a three-story brick warehouse and factory to be erected in the Midway district by the Simmons Manufacturing Company, University Avenue and Carlton Street. It will be 75'x180', pressed and common brick construction. Cost $40,000.

Christopher Ash, of St. Paul, received the general contract for the erection of the new freight station for the Soo Line, in St. Paul. It will be 500 feet long, Menomonie red sand mold brick to the top of the doors, and St. Paul Brick Company's white sand lime brick above. The interior will be of the Turner mushroom system of reinforced concrete. Cost $100,000.

The F. J. Romer Construction Company, St. Paul, received the general contract for the erection of the Stronge & Warner Company wholesale building at Fourth and Rosabel Streets, St. Paul. It will be of the Turner mushroom system of reinforced concrete conspicuous as the larger buildings, is more than made

Marshall & Fox, architects, Chicago, will prepare plans for a handsome theater to be erected in St. Paul by the Schuberts. Buechner & Orth, architects, St. Paul, will superintend the work. They will also prepare plans for a building which will surround the theater, for George Benz & Sons, to be five stories high, of fireproof construction.

Postle, Mahler & Denson, architects, St. Paul, have prepared plans for a reinforced concrete fireproof construction seed warehouse for the O. S. Jones Company, of Sioux Falls, S. D. Cost $75,000.

Reed & Stem, architects, St. Paul, have plans under way for science hall to be erected at Macalester College, St. Paul, to cost about $50,000.

Kees & Colburn, architects, Minneapolis, are preparing plans for two handsome churches to be erected by the Fifth and Sixth Churches of Christ, Scientist, one on the east side in Minneapolis and the other on Lowry Hill. Each will be of brick and stone construction and will cost about $150,000 each.

C. E. Bell, Tyrie & Chapman, architects, of Minneapolis, are preparing plans for a handsome fireproof passenger station to be erected at Duluth by the Soo Line, and its recently merged line, the Wisconsin Central. It will be two and three stories, 82'x115' in size, reinforced concrete fireproof construction throughout. Cost $100,000.

Robert H. McLaskey and Harry G. McLaskey have had plans prepared for a brick and reinforced concrete building to be erected at Chicago Avenue and Twenty-ninth Street, Minneapolis. It will be of brick and tile exterior wall construction. Cost $75,000.

Kees & Colburn, Minneapolis architects, have plans for a handsome theater building to be erected at Eau Claire, Wis., by F. L. Darling. It will be 40'x100', of pressed and molded brick, with cut stone or terra cotta trimmings.

H. M. Seby received the general contract to erect a clothing factory building for Guiterman Bros., St. Paul, on Gaultier and Blair Streets. Cost $15,000.

Clarence H. Johnston, architect, St. Paul, has prepared plans for an administration building and gymnasium to be erected at the state experimental station at Crookston, Minn. It will be three stories, pressed brick and cut stone. Cost $40,000.

Ries & Schaefer, architects, St. Paul, have prepared plans for a church for the Catholic society of Milbank, S. D., 60'x140', brick and stone construction. Cost $40,000.

Bids will be opened August 9 for the erection of the new Mechanics' Arts high school building in St. Paul. The estimated cost is $325,000. Kellogg, Rankin & Crane, architects, Philadelphia.

Downs & Eads, architects, Minneapolis, have plans in preparation for a three-story hospital building to be erected at Harriet and Franklin Avenues, Minneapolis, by the Hill Crest Surgical Hospital Company. It will be of pressed brick and cut stone construction, modern throughout. Cost $50,000.

Arthur C. Clausen, architect, Minneapolis, has plans for a store building to be erected in northeast Minneapolis by C. C. Belanger. It will be 86'x100', two stories at present, reinforced concrete construction. Cost $12,000.

Harry W. Jones, architect, of Minneapolis, is preparing plans for a handsome building to be erected for the Sheltering Arms Orphanage, in the vicinity of Minnehaha Falls, Minneapolis. It will be three stories, 54'x95', pressed brick and cut stone construction. Cost $65,000.

The International Sugar Feed Company, of southeast Minneapolis, has awarded contracts for additions to its plant to Haglin & Stahr, of Minneapolis. They will be of reinforced concrete construction. Cost $50,000.

The H. N. Leighton Company received the general contract for the erection of the nine-story wholesale dry goods house for Tibbs, Hutchings & Co., to be erected in Minneapolis at Second Avenue North and Third Street. Cost $225,000. Long, Lamoreaux & Long, architects.

Bids are being taken until July 24 for the superstructure of the Roman Catholic cathedral building in St. Paul, on plans by E. L. Masqueray, architect. The foundations are all in.

THE WEST COAST.

SAN FRANCISCO, July 8.—The volume of business is still increasing with the California cement interests. The majority of the mills are now running at their maximum capacity, and practically the entire output is being shipped as fast as it is ready for the market. A great deal of the material is now being delivered on old contracts, but new projects requiring large quantities are still coming up, and from the present outlook there will be little surplus on hand this year. So far, however, the California manufacturers have been able to take care of the demand without difficulty. The use of foreign cement seems to be dying out entirely in this market, owing entirely to the improved quality of the local product.

The June building record is somewhat encouraging, the total valuation of permits being $2,853,173, compared with $2,680,545 in May. Contracts are now pending on several large concrete buildings, including a lot of quarters at the military post in the Presidio. Contracts will also be placed shortly for the cement to be used in the large government drydock at Pearl Harbor, T. H. Another large order which will soon be placed is for an irrigation project at Crow's Landing, in the San Joaquin valley.

The Standard Portland Cement Company is keeping up its output at the full volume. The Santa Cruz mill is turning out better material than ever before, and its Davenport cement now heads the list in strength tests. A number of additional kilns are now being put in operation at this mill.

Following the example of San Francisco, the city of Oakland has decided to install a municipal asphalt plant, at a cost of $3,000.

The San Juan Portland Cement Company's plant at San Juan Bautista, Cal., has been closed, and will not be operated for some time.

The Board of Harbor Commissioners recently canceled the contract with Gray Bros., the large local crushed rock dealers, for material and construction on Section 11 of the seawall, on account of the failure of Gray Bros. to complete the work within the specified time.

Operations by the E. B. & A. L. Stone Company, the large crushed rock interests of Oakland, at the Leona Heights quarry, were terminated June 20, as the lease on the property has expired. The company is now removing its machinery to Stege, where it has another quarry. The Realty Syndicate, which owns the Leona Heights quarry, is installing a new plant, to remove about 2,000 yards of rock a day. The machinery will be of the latest type.

Bids have just been taken for the construction of Telford-Macadam roads in the Yosemite Valley.

The city of San Jose, Cal., has placed a contract for the erection of a municipal asphalt plant.

The city of Los Angeles has called for bids, to be opened August 2, for installing a rock crushing plant, with sizing machinery and storage bins.

The Southwestern Portland Cement Company, of El Paso, Tex., is about completed, and will begin work with a 1,500-barrel capacity on October 1. At a recent meeting of stockholders, Carl Leonardt, of Los Angeles, was elected president, F. Martinez, C. Butcher and C. V. Merrill vice-presidents, O. J. Binford secretary, and J. McNary treasurer.

A large deposit of talc has been discovered on the ranch of G. A. Richardson, near Porterville, Cal., and H. Wilkinson has organized a company to place it on the market. The rock can be disposed of at $4 per ton.

The California Hydraulic Stone Company has been incorporated in San Francisco, with a capital stock of $300,000, by C. F. Hitchcock, H. A. Zeckendorf, S. E. Scheeling, Wm. Grant and Max Von Jung.

The specifications for the foundations of a number of municipal buildings on which contracts have recently been let, including the City Hospital, Hall of Justice, Corporation Yard building and several schools, call for the use of hydrated lime with Portland cement, for the purpose of making the foundations waterproof.

The city of Seattle, Wash., has let a large paving contract, calling for asphalt with concrete foundation, concrete curbs and granite corners.

The Spaulding Rock Company has been incorporated at Los Angeles, with a capital stock of $50,000, by F. L. Spaulding, J. H. Foley, J. E. Heber, C. A. Thurston and C. G. Mann.

The Consolidated Pacific Cement Plaster Company has been incorporated at San Bernardino, Cal., with a capital stock of $300,000.

The California Stone, Sand and Gravel Company has been incorporated at Los Angeles, with a capital stock of $200,000, by E. J. Bacon, A. A. Irish and T. B. Russel.

A $30,000 rock crushing plant is to be installed at the Fairchild-Gilmore-Wilton Company's porphyry quarry at Corona, Cal.

Knowles & Kaiser have taken the plastering contract for a building at Post Street and Grant Avenue, San Francisco, for $10,650.

A $12,000 contract for composition floors for the San Francisco postoffice has been awarded to the Raymond Granite Company.

J. J. Connolly has taken a $11,200 contract for plastering the Clement School in San Francisco.

Baldwin & Howell have let a large contract for concrete runways and paths over the private ways in Presidio Terrace, a new residence park which they are placing on the market.

R. King, of the Kingstone Ornamental and Construction Company, which operates an artificial stone plant in Los Angeles, has sold a $25,000 interest in the concern to E. M. Benson and others, and has organized the Kingstone Brick and Building Company. The two companies will make artificial stone statuary, urns, mantels, columns, and all kinds of relief ornamentations.

ST. LOUIS.

ST. LOUIS, July 17.—As it is by comparison that we learn much, dealers in building materials, contractors and others identified with this line of business, are, to some extent, examining their books for the purpose of ascertaining how much more they are doing this season over the corresponding time last year. In many cases they are surprised at the gain. Those who report the largest increase, however, are concerns who enjoy a wide range of customers, reaching in some instances into other states. During the past three months but few new structures of even moderate size have been contracted for. On the other hand, there is a large amount of building in sight, the plans for which are now being prepared.

Early in the month the city of St. Louis advertised for sealed proposals for furnishing all materials for the river and shore piers of the new Municipal Bridge over the Mississippi River, including foundation work and masonry, granite coping and bridge seat stones. The deposit required is $13,325. The cost of this work will, it is stated, be, approximately, $500,000 to $550,000. Among the firms who are reported to be represented in the bids for this contract are the following: Midland Bridge Company, Kansas City; Kahmann & McMurray, Kansas City; Union Bridge and Construction Company, Kansas City; The Foundation Company, Chicago; Bravo Contracting Company, Pittsburg; James Stewart & Co., St. Louis; Missouri Valley Bridge Company, Leavenworth, Kan.

Subcontracts for supplying stone, etc., are being sought by Venable Bros., Atlanta, Ga., and the Kettle River Quarries Company, of St. Louis. Neither of the latter are contractors. Bids will provide three kinds of material—granite, limestone and sandstone, and the amount expected to be expended will depend on the kind of material accepted.

A casino which will rival the finest places of the kind in the country is to be erected on Delmar Avenue, just west of Taylor Avenue. The building, with its site, will cost in the neighborhood of $450,000. Harry W. Trimp, president of the Harry W. Trimp Building and Construction Company, is promoting the project. The building has been designed by F. A. Duggan. It is to be five stories high, built of enameled brick and will be highly ornate. The lot is 300x200 feet and the building will cover the entire lot. It is expected bids will be asked within a fortnight.

The committee on school buildings recently opened bids for the alterations to the Board of Education Building. The contract for the same, however, will probably not be let until after the departments which occupy the second and fourth floors have removed to the sixth and seventh, lately vacated by the Public Library. The lowest bidders were Evans, Daniel Construction Company, $15,764.

One of the finest commercial buildings of the new wholesale section is to be erected at the corner of Locust and Twenty-second Streets by E. E. Koken and George W. Sutherland, president and secretary respectively, of the Koken Barber Supply Company. The structure will have a frontage of 100 feet on Locust Street, 155 feet on Twenty-second Street and 100 feet on St. Charles Street, and will probably be eight stories high.

Bids were recently asked by the Board of Public Improvements for the contract to erect the Municipal Courts Building and the additions to the City Hospital. The bids for the latter building, estimated to cost $800,000, will be opened August 17, and the Municipal Courts Building August 10. The Municipal Courts Building contract is to be for the building under roof, with doors, windows, etc., and finished outside, the estimate on the work to be done being $1,000,000. No contract will be let on the jail building until the courts structure is completed. The jail will cost about $200,000 and $300,000 additional will be required to install the marble work, finish the plumbing, interior decorations, etc.

The many stone crushers along the bluffs above Alton are working day and night crews now, furnishing stone ballast and rip rap to the various railroads. The roadbeds of the roads are being washed out in places by the recent flood waters and long strings of cars loaded with rock are being rushed to the scene of the washouts from Alton. The Missouri, Kansas & Texas, across the river in Missouri, is the biggest purchaser.

"Business is way ahead of what it was here last summer," was Mr. Craney's rejoiner to the ROCK PRODUCTS man's inquiry, and as for Kansas City district, he said there was a good demand for Portland cement in that market. Trade is also picking up at Memphis, the Union Sand and Material Company having secured the contract for furnishing the cement and also the sand and gravel for the new skyscraper to be erected for the Central Bank and Trust Company. At their Kansas City plant all the burning is now being done with oil, the ideal fuel for cement burning. Oil burning has always been considered the best for treatment of the cement clinker, but owing to transportation charges it is seldom possible to use it. Perfect calcination to incipient fusion can be obtained only by intense heat. A more intense heat can be produced by oil than by either natural gas or any but the best grades of bituminous coals. In addition to this, the resultant hard clinker is triple ground, thus producing the finest grinding. Extra fine grinding is usually obtained by grinding under-burned clinker. Novices in the manufacture of cement are sometimes misled and suppose that a cement showing an extra high percentage through the 200 mesh sieve means good quality, while such a cement usually is the result from an under-burned clinker, and the use of a cement from an under-burned clinker is regarded as dangerous in important work or work designed to be of a permanent character.

The company is having a good business in their sand and gravel department, but Mr. Homer states that owing to high water the railroads are seriously hampered in handling freight.

M. R. MacKinnon, sales manager for the Continental Portland Cement Company, states that the demand for cement is quiet just now, following a lively trade during the spring which stocked up many of their customers temporarily. Mr. MacKinnon anticipates a good demand will set in early in the fall.

The office of the Universal Portland Cement Company has been removed from the Chemical Building to 3950 North Twentieth Street.

Col. Cobb, president of the Glencoe Lime and Cement Company, states there is a good demand for lime and building materials generally and the outlook for fall trade is excellent. The city of St. Louis is a good customer of the company and has recently been obliged to largely increase its purchases of lime for use in the settling basins, owing to extra muddy condition of the river water, brought about by its high stage and overflow.

E. W. Savage in the sales department of the Acme Cement Plaster Company reports a very heavy demand for plaster. The increase for the past six months, if all other producers are meeting with a corresponding demand, points to a total output for the country of over 2,000,000 tons, or fully 300,000 tons greater than last year. The company has equipped its Keene's cement mill and its plaster of paris mill at Acme, Tex., with electrical machinery throughout and have also doubled the capacities of both of these mills. The demand for wall plaster is good in California and their Los Angeles plant is loaded up with orders.

H. M. Duck, treasurer of the Meramec Portland Cement and Material Company, states that their Mississippi River Sand and Gravel plant is now completed, and but for the high stage of the river would now be in operation.

Mr. Slaughter, president of the Sinclair Quarry and Construction Company, reports the demand for crushed rock from the railroads beginning to set in, and as no business from this source has been in evidence for over a year, this change is very gratifying. The company is also getting some business from contractors engaged in building operations at the western section of St. Louis, which territory is readily reached from the company's plant at Vitus on the Rock Island railroad.

The Hunkins-Willis Company reports trade as active, the demand being good for all kinds of mason's building material and also for roofing, weatherproofing, etc. On inquiry, learned that this refers both to city and country trade. Gordon Willis very confidently and cheerfully confirmed truth of the news being promulgated at St. Louis that the wave of prosperity has really reached the town. They also look for a shortage in railroad equipment this fall—particularly with respect to cars, though it may not affect their trade, since it is not likely to set until the movement of the crops is quite general and by that period the busiest time in their line is over for the season.

THE BUFFALO DISTRICT.

BUFFALO, July 16.—The general improvement noted in the business world is making itself perceptibly felt in the cement trade and other branches of the rock products industry here. The local cement trade reports the volume of business to be good, but complains over the low prices.

There is considerable work going on in Buffalo and vicinity, such as railroad grade crossings and barge canal work. The immense amount of material embracing rock products required for these jobs is being mostly supplied by the local trade. The New York Central and Delaware, Lackawanna & Western railroads are contemplating immense grade crossing improvements in this city. Large appropriations for this work have already been made, but the letting of contracts will go over until about September 1.

Mayor Adam, of Buffalo, has signed a resolution ordering the filling in and macadamizing of the Hamburg Turnpike in this city. The two largest contracts for $75,000 and $31,400 go to F. V. E. Bardol, of Buffalo. The third, for a macadam roadway, was awarded to the Thomas Brown Contracting Company for $4,830.

"Business is booming," said W. J. McDowell, of the Union Cement Company, "and we are very busy. As far as the future is concerned we can see nothing but prosperity ahead for us."

The Alpha Portland Cement people report the volume of business to be very good. They are supplying cement for the large new addition being built to the automobile manufacturing plant of the George N. Pierce Company, the New York Central crossing at Parkside Avenue and Colvin Streets and many other smaller engineering jobs.

The General Mercantile Company is supplying Giant Portland cement in very large quantities to the New York Central's local grade crossing work, the barge canal and many other jobs. They report business to be fair at present, with a promising outlook for an increase next fall.

James H. Ross reports prices in cement to be rather low, but finds business fair. Mr. Ross is supplying large quantities of cement to the new additions now being erected to the Lafayette hotel and Public School No. 11. The brands he represents are Wayland, Lehigh, Dragon, Catskill, Akron and Cayuga Portland cements.

"Business is good, in fact, the best we've seen in a long time," said F. L. Lane, of the Buffalo Paragon Wall Plaster Company, "and I don't know the time when we were as busy as we are now." This company is supplying wall plaster for new buildings to be occupied by the Buffalo Seminary, George D. Hale and the Frontier Iron Works.

M. A. Reeb reports business to be fair and somewhat in advance of last year, and the future to be good. He is supplying large quantities of lime, cement and other building materials for the new Nicholas School and the large mercantile buildings now in course of construction, to be occupied by M. Wile & Co., clothiers, and Sinclair, Rooney & Co., wholesale milliners.

"Business in concrete blocks is excellent, and the future outlook is good beyond question," said M. H. Purcell, vice-president and general manager of the Buffalo Concrete Stone and Brick Company. We are supplying between 50,000 and 60,000 concrete blocks for the new Frontier Ice Company's building on Lathrop Street. Also a large amount of similar material for the new George D. Hale Building in this city and the Soeman Block, a new three-story structure in course of erection in Lancaster, N. Y. We are making and selling a large number of Egyptian burial vaults, the demand for them being very big."

At the offices of the Buffalo Cement Company business was reported by W. G. Shoemaker to be very good. "Our capacity," said Mr. Shoemaker, "is 1,000 tons of crushed stone per day and at the present time we have orders for all the material of this kind that we can possibly crush." This company is supplying crushed stone for the grade crossing work being done at North Buffalo by the New York Central Railroad.

Business is reported to be good at the offices of the General Lithelite Company and the Durolithic Company. The latter firm had the contract and recently finished the construction of the new local United States Marine Hospital Building.

Bids were recently received in the office of the Department of Public Works, Buffalo, for excavation and concrete, brick and iron work for two pipe tunnels from a point 42 feet east of the pumping station to Front Avenue. The lowest bidder is the B. I. Crooker Company at $21,500. The other bidders were Dark & Co., $22,900, and Joseph Stabell Company, $24,742.

Thomas A. Edison has begun an action in the United States Court in this city against the Allis-Chalmers Company, the Empire Limestone Company and the Casparis Stone Company. The action is brought to enjoin these companies from alleged in-

fringement of a patented stone-crushing apparatus. Mr. Edison also seeks to recover damages. It is said that the defendant companies are operating this apparatus near Pekin in Niagara County, N. Y. The apparatus consists of giant roller crushers provided on their surface with knobs or projections, which in revolving crush huge rocks, weighing as much as eight tons. Mr. Edison claims to have the exclusive right both to the rollers and the process.

At Albany, N. Y., recently, F. C. Stevens, New York State Superintendent of Public Works, awarded two additional barge canal contracts, aggregating an expenditure of $3,755,291. Contract No. 30, providing for the construction of the canal, river and land line from Little Falls to Sterling Creek, fourteen miles, was let to the Acme Engineering and Contracting Company, of Schenectady, for $2,591,666. Contract No. 42, providing for the construction of the canal from the Herkimer (Oneida County) line to Oriskany Road, nine miles, was awarded to Shanley-Morrissey, Inc., of New York, for $1,163,625.

Collector of Customs Merritt, of Niagara Falls, has been authorized to advertise for bids for exterior improvements to the federal building in that city.

Bids for the construction of an intake pipe and cribs in connection with a waterworks system at Niagara Falls were recently opened. The lowest bidder was The Buffalo Dredging Company, whose figure was $63,400.

A report from Schenectady, N. Y., says that the General Electric Company of that city will shortly begin the erection of a five-story reinforced structure, 202 by 73 feet in dimension and to cost over $200,000.

Martin C. Miller of this city was the successful architect in the competition for plans for the proposed new Technical High School to be built here. The cost of the new building will be in the neighborhood of $411,000, and Mr. Miller, if he decides to supervise the construction, as is probable, will get a commission of 5 per cent, or about $20,550. If he decides simply to make the working drawings, his commission will be 3½ per cent.

TOLEDO AND NORTHWESTERN OHIO.

TOLEDO, OHIO, July 17.—Toledo and northwestern Ohio are experiencing the most active building period known here for the past two years. For the most part the work consists of small structures but there is sufficient to make up for what it lacks in quality. With the return of industrial activity, there is an increased call for labor and real estate men and others who make a specialty of cheap residences are doing a good business. Of the better grade of residences but few are being built and of houses costing over $5.000 one can count them on the fingers of one hand and then have several digits left.

The buildings which are now demanding attention include a Masonic Temple, which is to be erected at Upper Sandusky, Ohio, plans for which are being made by Architect George B. Rheinfrank; a new Roman Catholic church on Nebraska Avenue, plans by Architect W. R. Dowling; a new brick residence for Herman Klauser, plans by Bernhard Becker; a new Methodist church and parsonage at Norwalk, Ohio, plans by Vernon Redding, Mansfield, Ohio; a brick flat building for the Investors Realty Company, plans by Architect George S. Mills; a new brick church for the Norwood Avenue Church of Christ, plans by Architects Langdon and Hohly; a new brick society building for the Toledo Aerie of Eagles, plans by Architects Langdon and Hohly; several new residences by George W. Lathrop, plans by himself; a new terrace by W. B. Allen, plans by Architect L. W. Tschumy; several new residences at Fremont, Ohio, plans by S. H. Shively, Fremont; a new residence at Port Clinton, Ohio, plans by Architect H. C. Millot, Sandusky, Ohio; a new brick church for the West Toledo German Lutheran church, plans by Architect L. G. Welker; a brick addition to the Rossford, Ohio, school building, plans by Architect F. E. Walker, and two new high school buildings for the Toledo board of education, plans by Architect David L. Stine.

Contracts which have been let during the past month were, an addition to the Overland Automobile factory, plans by Architects Bacon and Huber and general contract let to Richard Hattersley; First Presbyterian church, Defiance, Ohio, plans by Architect George S. Mills, Toledo, and general contract awarded to P. A. Baker & Bro., Defiance, Ohio; hospital building for the Toledo Methodist society, plans by M. M. Stophlet and general contract let to E. H. Riffner, mercantile building for Carleton Shaw, plans by Architect George S. Mills and general contract let to Thomas Skelding.

The event of the past month in structural work was the opening of the bids for the new Cherry Street bridge, a project which has attracted the attention of national bidders for the past two years. The bids as read are as follows: The Foundation Company, New York, $897,777; P. J. Carlin, New York, $829,084.50; Pneumatic Caisson Company, Troy, N. Y., $820,219; Standard Contracting Company and Central Dredging Company, both of Cleveland, $657,218; C. H. Fath & Son Construction Company, Cleveland, $813,787.75.

Paving operations throughout this part of Ohio have been active and engineers and contractors report a great deal more work than a year ago. The city of Toledo has begun preliminary legislation on considerable new work, chief of which is repaving Broadway from Knapp to Colburn Street. This was paved several years ago with Medina block and while but little worn it is very rough and uneven and property owners are anxious to have a more modern pavement. After about two years of fighting, notices have been sent and bids will shortly be received on covering the present pavement with either sheet asphalt, bitulithic or some sort of similar pavement.

A rush job of paving was that of lower Summit Street which was put through in record breaking time on account of the army tournament which was held in that part of the city early in July. Garrigan Bros. had this contract but were unable to finish it entirely before the tournament on account of inability to get help.

All kinds of brick work is being delayed here on account of lack of bricklayers and several brick contractors are continually advertising for men and are not choice in employing all who answer the ads and are capable of handling a trowel.

The Kramb Brick and Tile Company, of Oak Harbor, Ohio, is one of the newest brick companies in this section, it having incorporated but a short time ago. With the exception of A. E. Bollin, all the other incorporators are members of the Kramb family, five being represented as follows: H. C., William P., Albert J., Ida E., and C. H. The capital authorized is $15,000 and the company will manufacture soft tile and brick at Oak Harbor.

There are more soft or common brick available in Toledo than a month ago, this being due to large outputs by local factories during the past month. The Ohio Brick Company has just finished one large additional kiln which will practically double its capacity. A. R. Kuhlman, secretary of the Toledo Builders' Supply Company, is general manager of the company. Prices are considerably better than a year ago, although not yet up to the standard of prices three years ago.

Harry Wood, general manager for C. Edwards Holden, brick manufacturer at Mineral City, Ohio, spent several days in Toledo about the middle of the month, enroute home from Alpena, Mich., where he spent his vacation.

Lon Reilly, for several years selling agent for this territory for the Logan Brick Company, has accepted a position with the National Paving Brick Manufacturers' Association, with Michigan as his territory.

Peter Degnan, receiver for the Logan Brick Company, has not yet negotiated the sale of that plant as recommended in his report to federal court. Most of the brick stored in the yards of the company have already been sold but these were controlled by another company and were not considered in the report of the receiver.

The Metropolitan Paving Brick Company will shortly manufacture a building brick which will be some larger than the standard sized builder but considerably smaller than their regular paver. It will be cherry red and chocolate in color.

Work on the new postoffice building is progressing nicely, the concrete foundations now being ready to receive the granite bases. The fireproofing contract has just been awarded to the Federal Construction Company, of Cleveland.

Roy Loudenslager, for many years manager of the Toledo plant of the Venetian Art and Mosaic Company, has purchased the business and is conducting it at the former location on Monroe Street. The home office of the Venetian Art and Mosaic Company is in Detroit, the Toledo business being conducted as a branch. Mr. Loudenslager will continue in the same business and will not confine his efforts to local territory alone.

The Toledo Builders' Exchange will hold its annual outing at Sugar Island, between Toledo and Detroit, early in August. The exact date has been left to a special committee which will confer with the Detroit Exchange before deciding, as it is hoped to have a joint picnic as was held a year ago. A committee will arrange a full program of field sports which will probably wind up with a baseball game between the two exchanges. Rivalry on the diamond is high between these two bodies and a good game is assured, both from point of class and amount of amusement afforded. The Toledo Exchange extends an invitation to all builders from inland points to join in the outing. Sugar Island is reached only by the White Star line and anyone interested can secure full details as soon as arranged from C. T. Lawton, assistant secretary of the Toledo Builders' Exchange, Smith and Baker Building, Toledo. Every one going will take his own basket and there are no charges aside from the fare by boat which will be nominal and probably less than usual.

CLEVELAND AND NORTHEASTERN OHIO.

CLEVELAND, O., July 15.—Building records in Cleveland for the first six months of the current year show a decidedly healthy tendency. If the building boom keeps up for the remainder of the year on an equal basis, it is possible that a new series of totals will be established. For the six months ending July 1, the total value of permits reached $6,667,014, as against $4,080,079 for a similar period last year and $7,267,578 for a corresponding period in 1907. The building record for the month of June reached a total of $1,349,000, against $692,000 for June of last year.

Reinforced concrete is to be the principal material used in a new $100,000 apartment house to be erected on Euclid Avenue, opposite East Ninety-second Street, for M. J. Gleason, from plans prepared by Architect E. E. Smith. The building will contain sixteen suites of seven and eight rooms each and will be fireproof throughout. It is expected that the building will be completed by November 1.

Work is progressing satisfactorily on the new twelve-story building for the Brotherhood of Engineers at St. Clair Avenue and Ontario Street. The contractors are busy putting in the massive concrete footings which must be sunk forty feet in the ground. The contract for the erecting of the steel work has been let to the John Mullin Company, of Pittsburg, and for the superstructure to the A. & S. Wilson Company, of Pittsburg. The building will not be finished until some time next year. It will be finished in white tile.

John Hartness Brown is making valiant efforts to finish his big building on Euclid Avenue, which has been held up for the past three or four years. It is expected that when it is completed that it will be leased to a big New York firm. A job of concrete fireproofing amounting to many thousands and of plastering running into six figures, will be let soon if present plans materialize.

Work is expected to start soon on the six-story fireproof steel and concrete factory building for the Cleveland Worsted Mills Company on Broadway. It will cost $80,000 and will be an addition to an already mammoth plant. George S. Rider & Company are engineers for the structure.

The Henehan & King Company, of Cleveland, has started work on the new $40,000 lighthouse on the east arm of the new breakwater. The building will be of concrete, lined with brick. It is expected that the main part of the building will be enclosed before next winter. Later another lighthouse is to be built on the other arm of the breakwater. The work is being done under the direction of the federal government.

The F. & D. Lindhorst Company has been awarded the contract for a new factory for the Standard Welding Company on the West Side. The building will be 215 by 130 feet in size. Architect E. H. Sprackling has prepared plans for a four-story mercantile building 110 by 150 feet in size just west of the Hotel Euclid on Huron Road. Contracts for the building will be let as soon as the remains of an old building are cleared away. The Penton Publishing Company has purchased a lot and will erect a four-story publishing plant on Chestnut Avenue, near East Twelfth Street, some time this summer. The building is to be fireproof. A $40,000 addition is also being made to the Spencerian Business College at Euclid Avenue and East Eighteenth Street.

Heller Bros., of Youngstown, have been awarded the contract for a $150,000 building known as the Reuben McMillan Library, at Youngstown. It will be of stone and concrete. J. J. Callow, of Cleveland, gets the plaster contract. The building will be rushed to completion at once.

Chauncey Griffin has been awarded the general contract for the new $200,000 Anisfield Building. The concrete fireproofing has been let to the Carey Construction Company at about $35,000. The building will occupy one of the best corners in Cleveland.

Work is progressing on a ten-story addition to the Hollenden Hotel, which is to cost $90,000. The work is being done under the auspices of a superintendent until the main footings are in and the steelwork is carried through a two-story building which is being used as a kitchen and which must remain intact until the roof is on the new structure. The building will be of steel, heavily fireproofed with concrete. Brick walls will be used.

The city of Akron, near Cleveland, is to have a new hotel, costing $315,000. It will be erected on the site of the Empire House, the second largest hostelry in Akron. Frederick W. Rockwell, of the Hotel Ten Eyck, of Albany, is behind the project. When completed the building will be taken over by a syndicate on a thirty-year lease.

A three-story concrete and brick building is being erected on Euclid Avenue, just east of Trinity Cathedral, for the Euclid Perry Realty Company. E. A. Welland has the general contract for the work. The building is to be used as an auto garage.

Rapid progress is being made on the new county courthouse. According to a report just filed with the county building commissioners, there have been used to date 173 carloads of cement, 897 carloads of shale brick, 617 cars of sand, 250 cars of fireproofing, 430 cars of granite and 12 cars of lime. The total number of cars of material used is 2,813, having a total weight of 99,534 tons. Not a single fatality is reported by the contractors, Andrew Dall & Son.

A new concrete block church is to be erected for Christ's Church, at Superior Avenue and East One Hundred and Eighth Street, at a cost of $12,000. The blocks will be supplied by the Cuyahoga Concrete Stone Company. Rev. V. Boyer is pastor of the congregation for which the church is being erected.

The Contractors' Supply Company has been going only a month, but has secured the agencies for seven brick companies, a terra cotta company, two cement concerns and a general line of builders' supplies. The company now represents the Castalia Cement Company, of Castalia, O., and the Lawrence Cement Company, of Philadelphia. The demand for brick has been so heavy that a new salesman has been added to the force, in the person of George E. Andrews. The company has established a brick and tile exhibit in its offices at 854 Rose Building.

The Osborn Engineering Company, of Cleveland, has closed a contract for the construction of a cement plant at Arkansas City, Kan., and has started work on the preparation of plans. The new plant will cost $300,000.

William H. Kingsley, architect, of Cleveland, who has made a specialty of planning concrete houses and bungalows, has been chosen as manager of the Cleveland Concrete Building Block Company, with offices on the tenth floor of the Rockefeller Building.

A new company, known as the Lake Erie Builders' Supply Company, has been enlarged during the past month, with offices in the Citizens' Building. It expects to do a general supply business and will represent a number of outside brick and cement companies.

John A. Kling formerly president of the Cleveland Builders' Supply Company, who sold out his interests during the merger between that company and the Kelley Island Lime and Transport Company, has opened up an agency for Best Bros.' Keene cement, with offices in the Garfield Building.

Bert Graham, formerly with the Ohio Clay Company, has resigned his position to take charge of the brick department of the reorganized Cleveland Builders' Supply Company, of which W. H. Fay, formerly head of the Masons' Supply Company, is now manager.

KANSAS CITY DISTRICT.

KANSAS CITY, MO., July 17.—Early in June there was a hod carriers' strike developed in this city which affected some of the contractors to a considerable extent. The strike was threatened about the first of the year, and when it came to a show-down the hod carriers decided that it was a poor time to strike, as building operations were not so brisk but what they might be dispensed with, and non-union men employed, so they did not strike when their demands were refused. There was lots of building under way in June, and without any further notice they made their demands for an increase from 35 cents to 40 cents per hour. Some contractors were handling rush work and were forced to grant the demand, but most of the contractors refused the demand absolutely. The matter hung fire until towards the last of the month, when a compromise was effected whereby the hod carriers were to receive 37½ cents per hour. This new agreement is for a term of eighteen months.

In spite of the strike building operations continued good throughout June, and there is every indication that they will remain good through the balance of the year. The June increase over the corresponding month of 1908 was about one-third. The postmaster has just finished compiling statistics the information for which was gathered by his mail carriers, and showing that 3,682 residences were built here in the past year, besides 223 apartment houses and 252 business houses. He also learned that 1,068 residences, 125 apartment houses and 53 business houses are now in course of construction. The real estate statistics for the first six months of this year also show the healthy condition of the city. The transfers for the six months amounted to $24,981,736, or $9,420,736 more than in the same period of last year, and $2,000,000 greater than in any previous similar period. It is evident that all this activity is caused by past prosperity, as to the present time the prosperity of this year in this section has been rather problematical. This being an agricultural country, its prosperity depends upon the crops. All the crops except corn and cotton are already well made, however, the wheat production in this territory apparently being about as great as last year, and the prices are higher. Oats are harvesting a good crop, and there is a fine prospect for a corn crop, with plenty of rain, but of course this crop, which is by far the greatest of all the crops in this territory, must still have a good deal of good weather before it is made. As building operations to this time have been so good, it is natural to expect them to increase with the fine prospect ahead, especially so in this city, where there is now a very good prospect for the settlement of the Union Depot matter, and early construction work. There has been a vast amount of building planned to begin as soon as the new Union Depot was definitely settled, as the location decided upon will open up a fine area and largely extend the retail section. The building of the depot alone is a very small matter compared with the building it will cause between the retail part of the city and its location, and a proportional increase in building is expected in other directions. The fact that four or five stations are to be established in various parts of the city at which local freight shipments will be accepted for all roads is expected to build up large manufacturing centers in the outskirts, where to the present time the locations were handicapped by their distance from freight depots, confining their shipments to carloads, unless they made a long wagon haul.

The Bacon Building, which was burned some time ago, at 1020-22 Walnut Street, is being replaced by a concrete building, and the rapidity with which the work is going forward is attracting considerable attention. It was begun April 21, and is to be ready for occupancy by September 1. The Urban Construction Company is doing the work, and is using the Barnett Economy system of concrete work.

Col. C. F. Morse, president of the Kansas City Stock Yards Company, is authority for the statement that the new nine-story exchange building is to be begun early in the winter, probably in December, and will be completed as early next year as possible, the idea being to get the building in shape for occupancy before the heavy live stock season of the year arrives. It will be the finest live stock building in the United States, will contain 450 offices, and will have a frontage of 250 feet on Genesee Street by a depth of 126 feet. There will be no fancy or ornamental work on the structure, just a plain substantial building of steel construction, with stone and brick outside and modern fireproof construction throughout.

Four buildings are involved in the plans for the St. George Episcopal Church, which is to be built on a tract 250'x170' on Tracy Avenue at Thirtieth Street. The four buildings include the rectory, the church proper, the chapel and the parish house. All are to be so connected as to make one elegant building to cost about $180,000, and to be built of native stone.

The ground is now being cleared for the Midcontinent Hotel, and actual construction work is beginning without delay. This is to be one of the big buildings of the year in this city, and will be especially well located for a hotel. The G. L. Gray Construction Company is to do the work. Some $1,600,000 in stocks and bonds have been issued for the construction.

The Kansas City Southern Railroad is preparing to begin the erection of a freight depot at Eighth and Santa Fe which will cost $35,000.

The A. M. Blodgett Construction Company, of this city, has been awarded the contract to construct the new reinforced concrete causeway between Galveston, Texas, and the mainland at Virginia Point. The work is to cost $500,000, for which the county has already voted bonds. John Springer, secretary and treasurer of the company, claims that this job, when completed, will be the largest single piece of concrete work in the world. The causeway is to be 12,000 feet long and 70 feet wide. In the center there is to be a 100-foot Scherzer rolling ship span. On either side of this span there are to be fourteen arches, each seventy feet long. Each approach will be built of concrete and will be 4,000 feet long. It is the intention to have all the steam, interurban and other roads enter the city over this viaduct.

Roy V. Hoffman, a member of the Oklahoma state board of public affairs, which has the awarding of the contracts for the different public buildings of that state, was in Kansas City a few days ago, on his way home from an inspection of the Leavenworth, Kan., penitentiary. He says that his state will spend $1,500,000 on the erection of public buildings within the next year, including the Southern Normal at Ada, $200,000; Girls' Industrial School, Chickasha, $75,000; University Preparatory School, Claremore, $50,000; main hall of University Building, Norman, $200,000; reformatory, Paul's Valley, $100,000; Southwestern Normal, Weatherford, $75,000; Reform Industrial School, Granite, $50,000; State Penitentiary, McAlester, $400,000; Insane Asylum, Vinita, $200,000; School of Mines, Wilburton, $115,000; Southeastern Normal, Durant, $200,000.

An engineering experiment station for testing building material of all kinds has been established at the University of Missouri, and will be under the direction of Prof. H. B. Shaw, dean of the school of engineering.

Word comes from Cherryvale, Kan., to the effect that O. Swanson & Son, of Topeka, have been awarded the contract to construct the new Santa Fe depot at that point, and that Cherryvale brick will be used.

A stone, concrete and brick office building is being erected in Muskogee, Okla., by the Oklahoma City Construction Company.

C. C. Wright has taken out a permit to construct a two-story stucco residence, at a cost of $4,000.

G. E. Harvey has taken out a permit to construct five residences at 3700 to 3708 Penn Street, at a cost of $30,000.

The Victor Portland Cement Company, of Los Angeles, Cal., has let the contract for its reinforced concrete buildings to the F. O. Engstrom Company. The initial capacity of this plant is to be 1,500 barrels per day, and three kinds of cement will be made, white, commercial and marine.

Word comes from Kearney, Neb., that T. H. Bolte and Dan M. Atchison have organized a company to manufacture the Bole concrete mixer. The capital of the company is $25,000.

The Denver Chamber of Commerce, of Denver, Colo., has decided to erect a Temple of Commerce which will be five stories high and cost $125,000. Frank L. Bartlett is president of the organization.

Plans are now in preparation for an additional six stories to be added to the Willis Woods Theater Building.

It is reported that the Jackson-Walter Coal & Material Company is about to install a $50,000 plant for the manufacture of the Ferguson system of concrete blocks in this city. The plant will have a capacity of 20,000 blocks per day. C. P. A. Clough, secretary and treasurer of the Kansas City Coal & Fuel Company, another Jackson-Walker company, is to be in charge of the new concrete plant, which is to be located at Twenty-first and Holmes Streets.

It is now stated that the same interests which financed the Midcontinental Hotel are backing a big office building proposition to be located directly across the street from the hotel.

The Oklahoma Cement Block Press Company has been incorporated in Okmulgee, Okla., by William J. Simms, Aaron Fry and Jacob Bozarth.

J. S. Ford and others are about to establish a concrete block and building material factory in Girard, Kan.

Alexander Rieger, of J. Rieger & Company, has let the contract for the construction of a three-story and basement building at 1513 Genesee Street, which is already leased for ten years. The foundation will be made strong enough to carry additional stories.

Plans are being made for a business building to be erected at Ninth and Central Streets by J. E. Walker & Company.

The big plant of the Southwestern States Portland Cement Company, in Dallas, Tex., which has been under course of construction for months, is at last in operation. The output is to be 3,000 barrels per day and 200 to 300 men will be employed regularly. The company owns a tract of 535 acres, which will supply material for a good while to come. The plant is operated by producer gas, generated from Texas lignite.

A bond issue of $15,000 has been voted by Hutchinson, Kan., for the construction of a reinforced concrete bridge.

The George Rackle & Sons Company, of Cleveland, Ohio, has the contract for the artificial stone trimmings of the new First M. E. Church in St. Joseph, Mo., and they will be made on the ground where needed.

Plans and specifications have been approved for a new concrete bridge over Brush Creek, in this city, at Prospect Avenue. The estimated cost is $12,066, of which the city is to pay two-thirds.

Since our last issue there has been a considerable change in cement conditions. Up to this time there has been a good, steady business at steady prices, but now the prices are reported to be shot all to pieces and each mill is looking out for itself, regardless of prices reported made by other mills.

The Kansas City office of the Marblehead Lime Company is reporting a fine business up to the time of the high waters, but for the past week there has been little except passenger traffic on any of the railroads, on account of the waters having destroyed so many improvements, and all kinds of building material is being held by the railroads, in loaded trains, ready to go forward and fill up the places where the right of way has been washed clear.

John P. Wagner and other Kansas City capitalists are about to begin the construction of a reinforced concrete hotel building in Santa Fe, N. M., to cost about $200,000. The Pelletier Building Company, of this city, will have the contract for construction work.

ME AN' TH' OL' WOMAN AN' TH' KID AN' THE STOCK AN' TH' HIRED MAN AIN'T CEMENT AN' I GUESS THAT'S ABOUT ALL THAT AIN'T
IS THE CEMENT TIRES REAL SATISFACTORY M'AM ?
LIFE IS JUST ONE D-ARNED CEMENT THING AFTER ANOTHER
NOT CEMENT
CHARLES LEDERER

FARMERS ARE GETTING TO BE CONCRETE ENTHUSIASTS—WORK IT!

FOR THE RETAILER

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Meets Annually.

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Official Organ, ROCK PRODUCTS

All Aboard For Cedar Point.

The regular summer meeting of the Ohio Builders' Supply Association will be held at Cedar Point on August 13, 14 and 15. No official program has yet been decided upon, but the usual interesting business occasion, together with the pleasantest kind of social accompaniment, will be developed in the customary way.

The secretary's official call for this meeting will be issued in a few days to every member of the Ohio Association, as well as to all of those who have not yet seen the light or recognized the importance of attaching themselves to this progressive society.

All dealers in building materials in the state of Ohio who are not already members of this association are invited to secure membership application blanks from Bert J. Graham, secretary, 1335 Scofield Building, Cleveland, Ohio.

How Can the National Builders' Supply Association Justify It's Existence.

BY V. H. KRIEGSHABER.

One of the most difficult things for a national organization of any kind is to prove its activity in its particular sphere of action, so that all those who are or should be interested in it will see that there is justification for its existence.

We hear too often the remark: "What good does the national organization do me? I cannot attend its meetings; I am going to join our state organization, or the local organization in our own town."

To the man who does not get away from the narrow sphere of his own business this line of argument is generally sufficient to satisfy him that the national organization can do him no good; but to the active energetic dealer, who wants to broaden his knowledge as well as his sphere of action, the national organization offers a wide field of usefulness.

In the first place, it is worth all that one pays to attend the national meeting and meet in a social way your competitors and a great many of your supply people. One forms acquaintances and connections that are of lasting and valuable benefit. The organization itself, however, justifies its existence by promoting not only this feeling of good fellowship, but also by agitating questions of general effect and importance in the trade.

If in our own particular organization the building supply men will give more earnest heed to its purpose and principle, and lend their share of influence and support, a great many abuses, both petty and great, that exist in the business can be remedied by unity of action, but if we attempt single-handed to settle some of the vexatious questions that confront us we soon find ourselves unable to cope with the proposition.

I believe that one of the important things that the national organization can do, and probably will do in the future, will be the promotion and establishment of local organizations in the different cities through the active assistance of our conscientious and energetic secretary, the object of such local organizations being a better understanding among the dealers as to the local demands of their business.

I am satisfied that the national organization would gladly assist in the formation of such local organizations, in fact such an offer was made for one of our prominent cities, and the secretary expressed himself as more than willing to go there and try and bring the disagreeing and contending factions together.

A man is entitled to a reasonable living profit on his merchandise. It does not require good salesmanship to sell goods at or below cost, or at what is termed cut rate prices, and the building trades throughout the country do not require this of the building supply dealers. It looks, therefore, like a lack of good judgment when sensible men engage in such ruinous practices. Without desire to either corner the market, or engage in any illegal practices, there is still room for legitimate organization among the dealers locally to protect their business, and I look forward to the time when the national organization will make it a part of its business to encourage and assist in the formation of local bodies whose object is and will be the elimination of abuses, a better understanding among its members, and a more cordial relationship all round.

The only way, however, that the national organization can obtain this object will be through the cordial support which should be given to it by every progressive dealer in the country. Any man who considers himself of any note at all in this particular line of business should feel that it is necessary for him to be enrolled as a member of the National Builders' Supply Association, and I hope that this feeling will grow to such an extent that the Thousand Membership Club will soon be an actual realization.

Fire Resisting Home Building.

As the population of this country increases the problem of safe home building becomes more and more important. The fire risk to human life by the burning of homes is regarded as a trivial matter for the reason that the individuals that make up this busy world scarcely realize how extremely self-centered they really are. When the press dispatches fill up the daily newspapers with harrowing accounts of a great holocaust like the destruction of San Francisco or the great conflagration at Baltimore and similar catastrophes everyone takes an interest for a few days and then the details of property damage is much more discussed than that of the loss of human life. Is it possible that we are so material in our methods of thinking, and vitiated in our aspirations that we can regard the comparatively insignificant matter of a mere loss of wealth to that of the loss of human life? Let us hope not.

The big fire losses of the present year, namely those at Ft. Worth, Tex., Rochester, N. Y., and that at Chelsea, Mass., were more particularly confined to the residence districts, where thousands of families were made homeless and the usual percentage of human life wiped out. The principal lesson put forth in press dispatches and by the special correspondents of the daily press when describing great conflagrations is more distinctly pointed to the necessity of carrying full insurance upon investment in properties than to anything else. In minute detail they give the conditions after the fire of a great hotel structure, of an office building or of some of the other principal landmarks of the destroyed district, but of the hundreds of thousands of homes destroyed, a single sentence of a few words suffices to tell the whole story. It is quite probable that the investing public has learned the necessity for full insurance on such properties, the lesson being repeated in all the accounts of such fire losses. The large number of homes destroyed by fire prevents such losses from having news value to the newspaper, for if they should attempt to quote all of such fires that occur in this country it would take up all of their news space to report it.

How often do we hear the expression, "It was only a small fire, a five-room wooden cottage which burned up in a few minutes." Certainly there is much more of a human catastrophe attached to such a fire than to any of the large blazes where property fully secured and representing only a small part of the owner's wealth has been destroyed.

The most important development that the concrete industry has introduced is practical materials for the fire proof home, which from a humanitarian point of view excels every other achievement that has been accomplished by civilized man. It is only within the last year or two that it has been possible for a builder to erect a habitation that is absolutely fire resisting in all its parts and from every possible standpoint of attack. More than this, the intelligent application of concrete under the latest developments now known to the industry will permit of the construction of the smallest cottage, the more comfortable home or the palace of wealth at a cost commensurate with each purse, no matter how little this may be nor how elaborate the task of the builder. Safe construction no longer needs to cost a premium over the flimsy and unsafe types that for ages have been considered indispensable.

There is just one great need in all of the work in the field that ROCK PRODUCTS has undertaken and that is to let every possible builder know of the attainments of the concrete industry in this particular direction. There is much equipment needed in different sections of the country to provide the materials, and really no town should now be without an easily accessible supply of concrete materials.

It is impossible to recount each and every harrowing example of the carelessness which still prevails in every part of this country with regard to home building. One can hardly pick up a newspaper that some such account as the following does not challenge the eye:

SIX PERSONS BURN TO DEATH IN HOME.

DANVILLE, VA., July 5.—As the result of a mysterious fire which destroyed the home of S. E. Hamlett, at South Boston, early this morning, five of their children and H. A. Strange, aged 74 years, a Confederate veteran, were burned to death, and another child, aged 4 years, was seriously injured. Mr. and Mrs. Hamlett escaped without injury. The victims of the frightful affair are: H. A. Strange; Vernie Hamlett, aged 14 years; Beatrice Hamlett, aged 7 years; Violet Hamlett, aged 6 years; Cecil Hamlett, aged 3 years; Henry Hamlett, aged 18 months.

Mr. Hamlett, who is employed with a planing mill at South Boston, resided in a two-story frame building on the west side of the city, near the Norfolk and Western Railway. The fire was discovered at about 3 o'clock this morning by neighbors. At this hour the occupants of the house had not been aroused, but the building was almost enveloped in flames, the fire raging the worst on the south side of the structure.

The residence was threatening to fall in at any minute, when Mr. Hamlett and his wife were aroused. They were on the north side of the house and their 4-year-old child was in the same room. They crawled out of the window on the front porch and dropped the child to the ground. Both of the child's arms were broken by the fall. The baby was also slightly injured.

Does this not show the folly of home building by the use of combustible materials, when a home of the same size could be built absolutely fire resisting at little or no greater cost? If builders are so blind to the dangers that continually surround such structures, the law should step in and make it a felony to put up a building of this kind, and so surround the family of worthy and valuable citizens with such dangers. In the case of the rich man, and those in easy circumstances, it is more or less a matter of volition. They can of their own choice select such a quality of safety for the home in which they reside as they may choose, but these as a rule are not producers and represent no such value to the community as the man who puts in his day of honest toil and as a rule is unable from a financial standpoint to live in the type of a house that he would choose for the safety and protection of his family. He must live in such houses as are built for his tennantage by capitalists, so that houses built of such materials as the capitalist selects finally determines the degree of safety with which he is able to surround his family.

In the case just cited, had the house in question been built of the new concrete building materials now offered freely in the market and obtainable in almost every market, no such catastrophe could have befallen the comparatively helpless family, which was in fact entraped into death. It is highly probable that in this identical case the bereaved and damaged parents who miraculously escaped have been forced to take up their residence in another house of the same flimsy, combustible and dangerous construction as the one in point, and again it is quite as probable that the owner of this property will replace the destroyed house with another of the very same type, thus creating another fire trap and courting another such disaster.

There are some steps of progress in the advance of civilization which people may learn to use and acquire by the route of suggestion or gradual perception, but the improvement introduced by the concrete industry whereby safe homes can be built, should not be left as a matter of volition to careless capitalists, but the majority of the people who make the laws, recognizing their own safety in the act, should adopt such measures as will cause all new building operations to be constructed of such materials as cannot be burned. If it were not entirely feasible, more than that—convenient, there might be some excuses for postponing its adoption. No such

argument can be offered effectually, for in every community there are establishments that handle fire resisting materials, and can provide them in quantities without limit.

If every man in this country who makes a business of furnishing builders' supplies will make it his business to inform every home builder who applies for materials that it is possible to build the house in question entirely of non-burning materials, he will be speaking for the upbuilding of his own business and at the same time performing his full duty to his fellow man. There are still a very large number of people in this country who are not aware of the wonderful progress that has been made in concrete materials in the last few years and particularly in the last twenty-four months.

If the material dealer is not himself aware of all the modern improvements, so that he can impart the knowledge day by day to his customers, he is criminally negligent and blind to the best opportunities of his own business as well as his duty to the members of the community from which he draws his livelihood.

ROCK PRODUCTS wants every man who is engaged in the building material business to know that such information can be had at this shop which will place him abreast of the times, to make more business for his establishment and safer homes for the masses of the people in all parts of this country. Merely a letter or even a postal card sent to this office will place you in communication with the right information upon the important subject of home building safe from the fire danger to human life and loss of property in very large measure.

The Ottumwa Lime and Cement Company.

OTTUMWA, IA., July 7.—The Ottumwa Lime and Cement Company is owned by John Fullmer and his two sons, Orval E. and Lester. This company is the only exclusive builders' supply firm in this city. Their office and warehouse is at 204 South Court Street, in the heart of the city. The Chicago, Burlington and Quincy road has a track into the warehouse so that all supplies are easily loaded into it.

In the line of materials they handle Atlas, Universal and Medusa Portland cement. Lime they buy from St. Genevieve, Mo., in lump. They have not handled much hydrate, as the contractors, like in many other places, have not, as yet been educated up to the uses of this product. This is a very regrettable fact, and this applies not only here but every place else where lime is used. The great advantages of handling hydrate as well as working it are not fully appreciated by the contractor.

In hard wall plasters, they handle Plymouth brand, from the Plymouth Gypsum Company, Ft. Dodge, Ia., and the products of the Iowa Hard Plaster Company, of Fort Dodge.

Sackett plaster board is part of their lime and brick and clay tile from the local plants, while sewer pipe comes from the Ballmer and Post Pipe Company, of St. Louis.

Speaking of business, Orval Fullmer said: "We have not felt the panic out this way, as last year was the best we ever had. Iowa depends on the corn crop, and the farmers had a good one last year, with high prices. They are good spenders, so money was not tied up here. The rains recently have seriously affected business and the river from which we get our sand is running about ten feet higher than it ought. We can't produce any sand and with continual rains building is retarded. However, we look for a big fall trade."

The concrete workers here use crushed rock in their aggregate, as gravel is not as abundant here as it might be. The bed of the Des Moines River is limestone and the stone is taken out and crushed for commercial purposes.

The Citizens' Lumber Company.

MARSHALLTOWN, IA., July 15.—The Citizens' Lumber Company of this place is one of thirty-five yards whose main office is at Minneapolis. The yard is located on the Chicago and Great Western Railway and they have a large yard for the storage of lumber. Their warehouses for their other building materials are conveniently located near the track.

They handle, at this yard, Medusa brand of Portland cement from the Dixon (Ill.) mill of the Sandusky Portland Cement Company, and the Iola brand, manufactured by the Iola Portland Cement Company, Iola, Kas.; Plymouth brand of hard wall plaster, manufactured by the Plymouth Gypsum Company, Fort Dodge, Ia. They also carry lump lime and sewer pipe.

They report business as well as can be expected, considering conditions. Many of the smaller buildings in Marshalltown are now using concrete foundations, though not many concrete blocks have been used.

AURORA RETAILERS.

The Hustling City on the Fox River Keeps the Supply Men Busy Distributing Materials For Construction and Municipal Improvements.

Prosperity has undoubtedly settled upon the beautiful little city of Aurora. Its large manufacturing plants have taken on their old time scenes of activity, its retail stores are crowded with purchasers, and its streets, mornings and evenings, are thronged with mechanics and artisans coming and returning from their labors with that contented air and cheerfulness brought about by good wages and good treatment.

Public improvements are going on in all parts of the city; street upon street has been paved in the last six months, and many more streets will be repaved this summer and fall. Its citizens are public-spirited to a degree, as instanced in the action of the Improvement Club, composed of private citizens, who erected and wired on the streets ornate lamp posts with three and four electric burners enclosed in white globes, and then presented them to the city. The effect of these ornate lamp posts on the streets is striking and beautiful.

New structures for factories, business and residences are springing up in all parts of Aurora, and dealers in building material say, and believe, that there will be no let-up to the activity in building operations till the approach of winter. The dealers in building material have been kept very busy this year furnishing supplies, in strong contrast to a year ago at this time. The handling and supplying of building material is in the hands of experienced and energetic men in whom the people of Aurora place the utmost reliance.

James McCredie.

James McCredie has one of the largest and one of the best arranged yards for handling building material in Aurora. The office and yard is located at 235 South River street and on the Chicago, Burlington & Quincy railroad. He owns a private switch track which runs into the yard.

The warehouse close to the switch track has a capacity for storing twelve hundred barrels of lime, cement and plaster. For a specially built air-tight lime house, constructed on the principle of a refrigerator, he stores and always keeps ahead for immediate local demands a carload of lime. The line of lime he handles is the Wisconsin white lime, he being the only dealer in Aurora who sells it, and it is said he sells large quantities of it. In the yard, large sheds shelter a complete line of building material; a broad driveway circling the interior of the yard makes the handling and loading wagons of its material easy and quick. Mr. McCredie has established a reputation for promptness of delivery which is a matter of pride to him, and is greatly appreciated in building circles.

All the material he handles used in Aurora is teamed from the yard to jobs in all parts of the city. Ten horses and five wagons are required to do the hauling of this yard and the one located at 145 Spring street, also located on the Chicago, Burlington & Quincy road. The latter is used by him principally for coal.

He is the sole agent in Aurora for the Universal Portland Cement, Plymouth Gypsum and United States Gypsum Plaster. He sells much of these products by the carload direct. He handles sewer pipe and fittings of the Streator Clay Manufacturing Company, flue lining, wall coping, firebrick, fireclay, of the Chicago Fire Brick Company, pressed and common brick.

Last fall he supplied for the construction of the Young Men's Christian Association Building all the cement, lime, plaster, wall coping, etc. Over eight hundred barrels of cement, five hundred barrels of lime and eight hundred barrels of plaster went into the structure.

Gus. Aucutt's Sons.

Gus Aucutt's Sons' office and yard is located at 33 Walnut Street and the tracks of the Chicago and Northwestern road. Their own private switch track runs alongside the yard and warehouses, with a team track to load wagons with material direct from the cars. The warehouse, which stands close to the track, has a capacity for storing eight hundred barrels of cement and plaster. The leading brands the firm handles are the Medusa and the Atlas. The plaster handled is the product of Grand Rapids, Michigan. Sewer pipe and fittings they buy of Louis McNutt, Brazil, Indiana, and Akron, Ohio.

They carry a complete line of building material, including brick, firebrick, fireclay flue lining and wall coping. The lime sold is from the Wisconsin Lime & Cement Company, of Eden. In an air-tight lime house they store the lime needed for the daily local demand. The storage capacity of this lime house is close to three hundred barrels.

All of the material in the yard is delivered by team to the jobs in all parts of Aurora. They need six horses and four wagons to do the hauling, the average haul being about one and one-half miles.

Last fall they were awarded the contract for furnishing fourteen thousand barrels of cement for paving Fifth street, Center and Grant Place, Clark, Spruce, River and Walnut Streets. They completed the delivery of this enormous quantity of cement this month. The yard of Gus Aucutt's Sons is one of the oldest in Aurora, and gets its share of any business that is going.

J. E. Salfisberg & Company.

J. E. Salfisberg & Company, with office at 116 Fox Street, are cement work contractors. They take contracts for brick paving, cement sidewalks, cement blocks, foundations, bridges, reservoirs, tile and mosaic work floors and all kinds of concrete construction. They used ten thousand barrels of cement and five hundred thousand brick paving Claim Street, Iowa and Pennsylvania Avenues, Hiland and Second Avenues. Nearly all the cement they handle they use themselves, but sell and deliver to any part of the city required. The brands they use are the Universal, Chicago A. A., Peerless and Utica Hydraulic Cement.

White and Todd.

White & Todd's office and yard is located on Lake Street, between Downer Place and Holbrook Street. This lumber firm was established in Aurora forty-four years ago. A switch track runs into the yard from the Chicago, Burlington & Quincy road. Besides their lumber business, they deal in cement and building material, including sewer pipe and fittings, flue lining and wall coping. They handle exclusively Chicago A. A. Cement, which they sell in carload lots where demanded. They deliver by team material to all parts of the city.

S D. Seaman.

S. D. Seamans, dealer in lumber, lath and shingles, has his office located on the corner of Broadway and Benton Streets and the tracks of the Chicago, Burlington & Quincy Railroad, with a switch track running into the yard. He also handles cement, which he delivers in any quantity by team to any part of the city, and also sells in carload lots. His warehouse has a storage capacity of six hundred barrels of cement. He handles only the Wolverine brand.

J. F. Harral.

J. F. Harral's office and yard is located at the corner of Lincoln Avenue and Spring Street and the Chicago, Burlington & Quincy Railroad, with a switch track running into the yard. His principal business is coal and wood. He carries cement, sewer pipe, firebrick, fireclay, etc. The brand of cement he handles is the Universal, and sewer pipe, fireclay, etc., he receives from the Monmouth Mining & Manufacturing Company. He delivers cement and building material by team to any part of Aurora.

J. D. Dolton & Son.

J. D. Dalton & Son's office and yard is located at 157 Spring Street, with a switch track from the Chicago, Burlington & Quincy Railroad running into the yard. Their principal business is coal. They handle cement, the leading brands being Chicago A. A. and Atlas, and sewer pipe of Louis McNutt, Brazil, Indiana. They deliver cement and sewer pipe in any quantity to jobs by team in any part of the city.

Hanna & Todd.

Hanna & Todd, among the largest lumber dealers in Aurora, have their office and yard located at 85 South River Street. A switch track runs into their yard from the Chicago, Burlington & Quincy Railroad, and they have excellent facilities for handling cement. The leading brands handled by them are the Atlas and Marquette, which is delivered by team to any part of the city. They also sell cement in carload lots.

Bowles Brothers, Durham, N. C., want prices on building materials, etc., for an $8,000 dwelling, Burlington, N. C.

The Producers' Stone Company, Chicago, has been incorporated with a capital of $5,000. General contracting, stone and building material business. Wm. E. Rafferty, Grant Howell and J. N. Heldman, incorporators.

INDIANAPOLIS.

No Complaint From the Building Material Interests of the Indiana Metropolis.

PECULIAR RESTRICTIONS OF NEW BUILDING LAWS.

INDIANAPOLIS, July 20.—Had it not been for the adverse atmospheric and legislative conditions existing this year and materially affecting building operations here as well as in all the larger cities in the state, the dealers in building material would have found no excuse to complain about business. As it is the dealers in Indianapolis have had a business quite up if not a little beyond that of the same period last year.

Heavy rainfalls last spring and summer, increasing in the months of June and July, rain falling twenty-six days in that month stopped many people from building. But the most notable effect seen and felt in building circles are the two acts passed by the legislature, one known as the Thornton Law and the other known as the Housing Law. The first checking all public improvements in streets and the other checking building of flats, apartment, lodging and tenement houses.

Formerly laying pavements in streets, property owners were assessed according to the frontage of their lots on the street improved and also included the intersections of the street. Under the Thornton act, the city now must assume the burden of expense for the intersections on streets improved. In the aggregate this additional expense is very heavy, and Indianapolis, like all other cities, being broke, must stop making public improvements till it can make a new tax levy compelling property owners to pay for street improvements by which their property is not benefited.

The Housing Law, which was passed by the Legislature last March, affects all buildings used for living purposes, such as flats, apartments, lodging and tenement houses. It restricts such buildings from occupying more than sixty-five per cent of the ground occupied if it is an inside lot, and eighty-five per cent of the ground on corner lots. Further, no building may be put up and used for living purposes in the rear of another building occupying the front part of a lot; nor may any such building be nearer than fifteen feet of the rear line of the lot; nor may any such building be erected higher than one and one-half the width of the street. There are a number of other provisions which are as ridiculous as absurd and some positively unsanitary.

A prominent man of affairs in Indianapolis said, in speaking of these acts, that it reminded him of the Duke of Buckingham's epigrammatic characterization of King Charles the First, "that he never said a foolish thing and never did a wise one," which he would paraphrase, characterizing this Legislature "as doing more fool things than wise men could fathom." At any rate, it has hung up building operations here to an extent which Mr. Hunter, of Rubush & Hunter, architects, estimates conservatively at six hundred thousand dollars this year. Adding to this the stoppage of public improvements, it is a matter of wonder that the dealers in builders' supplies have done as good a business, practically, as last year.

The dealers in building material all believe the outlook is very promising for the remaining months this year. They have reason to feel so, as crops in the State look well; the wheat crop may likely fall short one-third this year, but the corn and oats crops will be greater than last year, is the opinion of men who have been over the greater part of Indiana, if we have the average weather it is reasonable to expect. The farmer will get good prices—better than last year—for all his cereals, and he will continue to enjoy prosperous times, which means that he will keep on improving his farm. In these improvements cement will largely enter, which the agricultural sections are using in larger quantities every year. The demand for cement in the agricultural districts is estimated at least to be thirty per cent over that of last year.

With six yards handling building material, located in the north, south, northwest and east sections of the city, the Indianapolis Mortar and Fuel Company, A. E. Bradshaw, president, with general offices at 407-408 Odd Fellows Building, conveniently and promptly delivers material by team to all points in the city.

These yards are located on one of the following railroad lines: the Monon, the Big Four, the Pennsylvania and the Belt Railway. Switch tracks run into every yard and each yard has admirable facilities for handling and shipping the supplies stored there.

The total storage capacity of its warehouses is twenty-five thousand barrels of cement and fifteen thousand barrels of plaster and six carloads of lime. The lime houses are built with double walls, floors and ceilings, on the same principle as a refrigerator. Its plaster mill, located at West Washington Street and the Belt Railway, has a capacity of turning out eighty tons of plaster per day. The product is known as the Hoosier plaster. The company owns and uses one hundred and twenty-five horses and sixty teams to do the hauling for its six yards.

It handles principally Lehigh and Alpha cements, lump lime from Huntington and Mitchell, Ind.; hydrated lime from Gibsonburg and White rock from Ohio; sewer pipe and fittings, wall coping, etc., from Louis McNutt, Brazil, Ind., and from Akron, Ohio, mortar, colors, special cements, and a large line of pressed brick; fireproofing material from the Northwestern Expanded Metal Company, and lath. This concern does a large jobbing business in surrounding towns, to which material is shipped by rail.

A. B. Keeport & Co., dealers in coal and building material, have three yards; the office and one yard are located at 620 North Senate Avenue; the main yard runs from Walnut to North Streets, on the Big Four Railroad, with a switch track running alongside of it close to coal sheds, cement, plaster and lime warehouses, and a yard at Fayette Street, just north of North Street, used solely for storage purposes.

All these yards have driveways touching all points where material is stored to facilitate its handling and saving labor and time to make prompt deliveries to jobs in all parts of the city. The warehouse has a

A. E. BRADSHAW, PROMINENT SUPPLY MAN OF INDIANAPOLIS.

storage capacity of six thousand barrels of cement and the lime house holds two carloads of lime.

The lime house which has been built on the principle of a refrigerator, has a partition which divides it equally into two sections. In one section magnesia lime is stored, and in the other, calcium or hot lime. This has proved to be an advantage much appreciated by the trade in the spring, when it requires a mixed lime. Alpha, Atlas and Lehigh cements are the principal brands handled by the company, the product of the Grand Rapids Plaster Company, and Sackett's plaster board. They have the agency here for both the plaster and the plaster boards. They carry a full line of sewer pipe and fittings, wall copings, fire clay, flue lining, etc., from Wm. E. Dee, Chicago, and Louis McNutt, Brazil, Ind.

They carry one of the largest stocks of lath in the city, selling over eight millions of lath yearly. Four double and five single teams are required to do the handling for these yards.

The general offices of A. B. Meyer & Company, dealers in clay products, are at 19 North Pennsylvania Street, Indianapolis. This firm has seven yards in different parts of the city, located either on the Big Four Railway, Pennsylvania Railroad, Monon Railway or the Vandalia Railroad line, with switch track running into each yard, which has exceptionally good facilities for handling these products.

They carry cement, plaster, lime, sewer pipe and fittings, and twenty odd lines of other building material. Their plaster mill in one of their city yards has a capacity of twenty-four thousand barrels per month, and is known far and wide as the Stonewall wall plaster, used both for exterior and interior of buildings. Mr. Meyer stated that in fully two-thirds of the larger buildings recently constructed the Stonewall plaster was used and that they were now shipping to Sault Ste. Marie, for use in the Postoffice Building there, eight hundred tons of their plaster.

The trackage of their combined yards is one hundred cars, and the ground space of these yards equals twelve and one-half acres.

The storage capacity of all their warehouses in the seven yards is ten thousand barrels of cement. Their trade extends all over the State of Indiana. Deliveries by team from their Indianapolis yards occasionally are made to jobs six and eight miles distant. They use for this delivery one hundred teams. They have dealt in coal thirty-two years and thirty years in building material.

Frank M. Dell is one of the oldest dealers in coal and builders' material in Indianapolis. His business was established in 1869, and he has been at his present location with offices and yard at 730-740 East Washington Street since 1889.

He has one of the best arranged yards for handling building material in the country. A switch track runs into the yard from the Big Four, skirting his cement, plaster and lime warehouses.

Two driveways running north and south split the yard into two sections and one driveway runs east and west. The yard fronts on three streets, East Washington, Davidson and Market Streets, consequently teams can enter into and go out of the yard on its driveways on three streets, an advantage few yards possess. These driveways touch all parts of the yard where material is stored.

The warehouse has a storage capacity of eight thousand barrels of cement and plaster, and his lime house, which is built with double walls, floors and ceiling, on the principle of a refrigerator, holds three carloads of bulk lime, which can be kept in storage without danger of air-slaking a month or more in the most trying weather. Sewer pipe and fittings are stored in bins and sheds, each bin labeled with kind, shape and size, obviating confusion and time in handling what is wanted.

The yard is wired for electric lighting, and on dark afternoons in the fall sixty or more electric lights on driveways, in warehouses and sheds, spread light to every nook and corner in the yard.

He handles Ironton cement from the Ironton Portland Cement Company; lime, both lump and hydrate, from the Ohio and Western Lime Company, and the Crown hydrated lime from Missouri; plaster from the United States Gypsum Company, from Newark and Grand Rapids; a full line of sewer pipe, fittings, fire clay, fire brick, wall coping, etc., from Wm. E. Dee, of Chicago, and the Robinson Clay Products Company, of Akron, O.

Mr. Dell said that the territory in which building material was sold is curtailed more and more every year by men in little towns and hamlets putting in builders' supplies, till today his business is confined to Indianapolis, but what had been lost in territory is made up in the greater demand for cement and the other lines. A large number of teams owned by him deliver material to jobs in any part of the city.

Fred Goepper, dealer in coal and builders' supplies, has been fourteen years in business and has one of the most completely equipped yards for handling material economically and promptly in Indianapolis.

It is located with office at 429 Holmes Avenue, corner West Michigan Street and the Cincinnati, Hamilton and Dayton Railway. A switch track from this railway runs alongside the entire length of the yard, its warehouses and coal sheds. The storage capacity of his warehouses is one thousand barrels of cement and plaster; the lime house, built on the refrigerator plan, holds one carload of lime. He manufactures what is known as the Goepper plaster. His plaster mill at the yard has a capacity of turning out fifteen tons of plaster per day. He owns and uses for hauling twenty horses, three single and eight double teams.

Frank Carees, assistant manager, told of a new departure Goepper had made lately in using automobile trucks for hauling. He uses three of these autotrucks and they do their work splendidly. One truck, he said, does the work of four teams. One made a trip in one and one-half hours the other day loaded heavily. It would have taken a team to make this trip eight hours. He delivers to all parts of the city and surrounding country, having a brisk farm trade within fifteen miles of the city.

He carries Alpha, Medusa, Atlas and Continental Portland cements, plaster of the American Gypsum and Acme Cement Plaster Companies, besides his own; lime from the Ohio and Western Lime Company, both bulk and hydrated; a full line of sewer pipe and fit-

tings, including flue lining, fire brick and wall coping, from Wm. E. Lee, of Chicago, and the Robinson Clay Products Company, of Akron, O.; gravel, sharp, soft and coarse sand, Mt. Silica; white sand, from Ottawa, Ill., and cement, brick and blocks.

Of the thirty-one yards handling lumber, coal and building material scattered over the State of Indiana, two of them in Indianapolis are owned and operated by the G. W. L. Co. (Greer-Wilkinson Lumber Company), and the one at Twenty-eighth Street and the Monon Railroad, with switch track for twelve cars running through center of yard, handles exclusively coal and building material.

The switch track runs by its cement, plaster and lime warehouses, which have a storage capacity of two carloads of lime, five thousand barrels of cement and seven hundred and fifty barrels of plaster.

Broad driveways pass through center of yard, touching all points in it where material is stored, giving ideal facilities for handling material quickly and promptly for delivering to jobs in all parts of the city. The yard is wired for electric lighting; more than seventy lights are distributed in office, stable, warehouses, coal sheds and over driveways. The arrangement and equipment of the yard were planned and perfected by its general manager, H. S. Husted.

It handles Edison Portland Cement from the Edison Portland Cement Company, New Village, N. J., and United States Portland cement; lime, both bulk and hydrate, from the Ohio and Western Lime Company, of Huntington, Ind., and the National Lime and Stone Company of Carey, Ohio; plaster from the United States Gypsum and American Gypsum Companies; sewer pipe and fittings, flue linings, wall coping, fire brick, fire clay, etc., from Wm. E. Dee, of Chicago, and wood and metal lath. It owns and uses for delivery of material sixteen horses and seven double teams. The business of the Twenty-eighth Street yard is confined to Indianapolis.

The Wales Coal and Lime Company was established in 1876 and incorporated in 1900, with George R. Wales president and treasurer. Its office and yard are located at Martindale Avenue and the Big Four Railroad. A switch track runs alongside of yard and its cement and lime warehouses. It has three driveway entrances, one on Massachusetts Avenue, one on Martindale Avenue and one on an alley.

The equipment and arrangement of the yard have been made solely with a view of handling material with the minimum of labor and facilitating prompt delivery. The storage capacity of its warehouse is fifteen hundred barrels of cement and plaster; the lime house, built on the refrigerator plan, holds two carloads of lime.

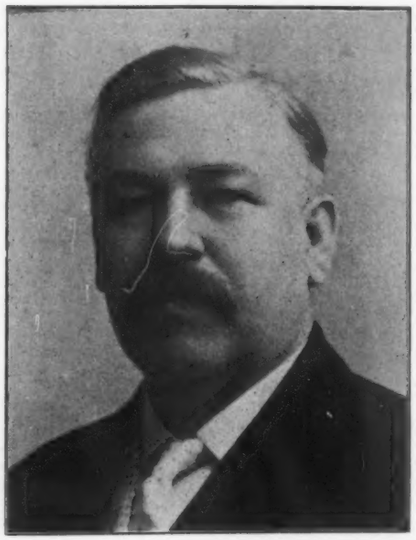
Alpha cement is handled at this yard; lime in bulk and hydrate from Huntington, Ind., and plaster from Grand Rapids, of the American Cement Plaster Company; sewer pipe and fittings, including flue lining, fire brick and clay and wall coping from Wm. E. Dee, of Chicago, and the Robinson Clay Products Company. It uses twelve horses and eight teams for hauling material within the corporate limits. Its business is mostly confined to Indianapolis.

The Malott Coal and Lime Company, dealers in coal and building material, has its yard and office at the corner of Massachusetts Avenue and Davidson Street. Two switch tracks from the Lake Erie and Western Railway run into the yard, one through the center and the other on the side near to the warehouse, which has a storage capacity of two thousand barrels. Two driveways in the yard, so located as to reach all points where material is stored. There is no better equipped yard in the city for handling and promptly delivering material to jobs in any part of Indianapolis.

It handles Alpha and Superior cements; plaster from the United States Gypsum and American Cement Plaster Companies; lime, both bulk and hydrate, from the Ohio and Western Lime Company, Huntington, Ind.; the Woodville White Lime Company, and Tiger brand from the Kelley Island Lime and Transport Company; the lime house, built on the refrigerator plan, holds one carload of lime; sewer pipe and fittings, wall coping, flue lining, fire brick, etc., from the American Fire Proofing Company, Akron, O.; Uhrichsville Clay Manufacturing Company, Uhrichsville, O.; wood and metal lath from the General Fire Proofing Company, of Chicago.

It owns and uses ten horses and five double teams. Its business is confined altogether to Indianapolis.

The big lumber, coal and building material yard at the corner of West Market and Missouri Streets, owned and operated by the Balke & Krauss Company, is among the best arranged and well equipped yards for handling and delivering this material in Indianapolis.



A. B. MEYER, PROMINENT SUPPLY MAN OF INDIANAPOLIS.

It is located on the Big Four Railroad, with switch track running into yard close by its warehouses, which have a storage capacity of two thousand barrels of cement and plaster and two carloads of lime. Its business is principally confined to the city and deliver material to all parts of the city. Twenty-four horses and twelve teams are owned by this company which it uses to do its hauling.

Atlas, Universal and Alpha cements are the principal brands sold at this yard; lime, both in bulk and hydrate, from Huntington, Ind.; the United States Gypsum Company's, Grand Rapids, Mich., and Newark plasters; sewer pipe and fittings, flue lining, fire brick and fire clay, as well as wall coping from the Robinson Clay Products Company, of Akron, O., complete the full line of building material this company sells.

Seven large yards handling coal and building material, distributed in convenient and central parts of the city, are owned and controlled by the Indianapolis Coal Company, with general offices at 113 North Pennsylvania Street.

They are severally located on the Pennsylvania, Vandalia, Big Four, Monon, and Cincinnati, Hamilton and Dayton Railroads, with switch tracks running into each yard. Driveways in each of these yards run close to every point where material is stored, resulting in handling material with a minimum of labor and a great saving of time, ensuing prompt delivery by team to jobs in all parts of the city.

The total storage capacity of the warehouses in these yards is ten thousand barrels of cement and plaster and two thousand barrels of lime. This company handles Atlas, Universal, United States, Alpha and Superior Portland cements; plaster from the United States Gypsum Company; lump and hydrated lime from the Ohio and Western Lime Company; sewer pipe and fittings, flue lining, fire brick, fire clay, wall coping, etc., from Wm. E. Dee, of Chicago, and Louis McNutt, of Brazil, Ind. It also handles lath, hair, mortar colors, white sand and pressed brick.

It owns and uses one hundred and twenty-five horses, divided up into sixty teams, for delivery of material. Considerable business is done by this company outside of Indianapolis.

ONE OF THE YARDS OF A PROMINENT INDIANAPOLIS CONCERN.

The Alday & Coonse Company, dealers in coal and building material, has office and yard at corner of East Washington Street and the Belt Railway. A switch track from the Panhandle Railway runs alongside the entire length of the yard close to the warehouse; a driveway in the center of the yard, on both sides of which material is stored in the open, which makes it exceedingly convenient for handling it economically and promptly.

Its warehouse has a storage capacity of fifteen hundred barrels of cement, lime and plaster. The principal brands of cement the company handles are Lehigh and Atlas; plaster from the United States Gypsum Company, and lime, both hydrated and in barrels, from Huntington, Ind.; sewer pipe and fittings from Wm. E. Dee, of Chicago, and Louis McNutt, of Brazil, Ind.

The company stables eighteen horses in a well appointed barn in the yard and uses nine double teams to deliver material, principally in the East Side of the city, which it practically covers. It has another well equipped yard at Irvington. It was established six years ago and is among the principal yards in Indianapolis.

The Irvington Coal and Lime Company, dealer in coal and building material, has its office and yard in Irvington, at 5643 to 5663 Bonnell Avenue. It is modern in all its appointments; its warehouses for storing cement, plaster and lime are large and conveniently located near to switch track and driveways, enabling easy handling of material, saving labor and insuring prompt delivery.

A switch track from the Panhandle Railway runs through the yard and three driveways touch all points where material is stored and leave nothing lacking in its admirable arrangement.

Universal, Lehigh and Superior Portland cements, Apex and Hoosier plasters, Huntington lime, a full line of sewer pipe and fittings, the product of Akron (Ohio) manufacturers, drain tile, pressed and common brick complete the line of building material this company sells. It supplies the territory in Indianapolis east of the Belt Railway.

The Brannum & Keene Lumber Company, dealer in lumber and building material, established two years ago, has three yards in Indianapolis. Its main yard and office are at East Washington Street and the Belt Railway, its East yard at Railroad Avenue, Irvington, and its North yard at Twenty-fifth Street and Lake Erie and Western Railway.

All of these yards have switch-track facilities, with team track and driveways running through them and close to the warehouses for convenient and economical handling of Wabash cement it carries. The storage capacity of each of these warehouses in its yards is five hundred barrels of cement.

The company intends by fall to put in its main yard a full and complete line of building material and build a large warehouse for storing cement. Its business at present is confined in territory to the city of Indianapolis.

S. A. Hull bought the yard at 287 Downey Avenue, Irvington, last fall, deals in coal and building material. It is located on the Cincinnati, Hamilton and Dayton Railroad, from which a switch track runs into the yard with driveway close to the warehouse, which has a capacity of one hundred and fifty barrels of cement. He handles Lehigh and Vulcanite cements, White River sand and gravel. He delivers cement to all points in Irvington and as far as the Belt Railway.

In the spring he will institute a number of improvements, including grading the yard and building a warehouse with a storage capacity of six hundred barrels of cement and carrying a full line of building material.

Gill & Greenen, dealers in coal, wood and cement, with office at 2220 East Washington Street and yard at 120 South State Street, have been in business for eight years.

A switch track runs into the yard from the Pennsylvania Railway close to the warehouse, which has a storage capacity of one thousand barrels of cement. They sell exclusively Marquette Portland cement, their territory being confined to Marion county. They deliver cement by team to jobs within the corporate limits of Indianapolis.

National Builders' Supply Company, Arthur M. Lutes, president; George Gray, secretary and treasurer, has been incorporated on May 24, 1909, under the laws of Oklahoma, at Oklahoma City, Okla.

To Show Builders' Material.

WASHINGTON, D. C., July 1.—With the object of securing a permanent exhibit of builders' materials in the National Capital, several Washingtonians connected with the local Builders' Exchange have secured incorporation under the laws of Virginia of the Builders' Exchange Exhibit Company. The capital of the organization is placed at a minimum of $3,000 and a maximum of $100,000. Samuel J. Prescott is president of the company, Cuno H. Rudolph vice-president and E. C. Graham secretary.

For a long time the manufacturers and dealers in building materials in Washington have felt the need for a central point where samples of new appliances, inventions and other incidentals connected with construction work might be assembled and inspected. Now that the incorporation of the company has been accomplished, it is understood a suitable location for the exhibition hall will be secured without delay, and the opening of the "show" arranged probably for the 1st of September.

Increase Capital Stock.

The Cumberland Sand Company, Cumberland, Md., composed of John Husband, Samuel N. Murphy, Byrnes Husband and Charles Murphy, has increased its capital stock from $15,000 to $20,000.

Destroyed By Fire.

CLINTON, OHIO, July 1.—The sand plant of the Franklin Industrial Company was destroyed by fire recently, causing loss of $40,000, partially covered by insurance.

Increase Output.

MANISTEE, MICH., July 2.—The Manistee Brick Company is now producing sand lime brick in a larger quantity than ever before. The original capacity has been estimated at 20,000 bricks in twenty-four hours, with two ten-hour crews, but this has been raised to 22,500 bricks, with one shift working ten hours.

Burns First Kiln of Brick.

BALDWIN, LA., July 1.—Dr. John B. Sewell started the fires in his first kiln of brick this morning. He has 62,000 brick in the kiln. These were made by hand, and are being burnt in an open kiln. After these are burnt the doctor expects to get improved machinery and make bricks by modern methods. This plant is on Bayou Teche, nad near the Southern Pacific Railroad, which gives shipping facilities by rail or water.

Brick Machine Company Chartered.

The Virginia State Corporation Commission has granted a charter of incorporation to the Alexandria Repress Brick Machine Manufacturing Company, of Alexandria. The capital stock is to be not less than $10,000 nor more than $25,000, and the officers and incorporators are Edwin L. Cockrell, of Woodbridge, Va., president; David N. Rust, Jr., of Braddock Heights, Alexandria County, Va., vice-president and treasurer, and William R. Stone, Jr., of Braddock Heights, secretary and general manager.

The La Rue Tile Company has been incorporated at La Rue, Ohio, for $50,000, by C. M. McAlister and others.

Oklahoma Cement Company Organized.

The Oklahoma City Portland Cement Company has been incorporated, and will establish main offices in Oklahoma City. A plant will be erected at once at Hartshorn, Okla. The capital stock is $1,200,000.

Officers of the new corporation are: C. B. Black, Oklahoma City, president; A. Bollenbach, Weatherford, vice-president; H. J. Cerwinsky, Hartshorn, second vice-president; D. W. Keller, Deer Creek, secretary; Elta H. Jayne, Edmond, treasurer.

Other stockholders are: O. W. Weiser and C. E. Toole, of Edmond; A. C. Farmer, A. F. Bimford, Ed L. Klein, L. S. Brown and W. W. DeLong, Oklahoma City; George Landrum, C. L. Scott, Weatherford; J. S. Dexter, C. F. Eberle, R. E. Lehman, Dr. J. F. Martin, Walter Collster, A. M. Van Volkenberg and Frank Roberts, of Deer Creek.

The company controls cement property at Ada and Reynolds (Okla.), and contemplates erecting plants there at a later date.

The Panama Portland Cement & Development Company, incorporated, with a capital stock of $3,000,000, is planning to begin the construction of its proposed plant at Forkland, Ala., with daily output of 1,000 barrels of cement.

CEMENT

REGULAR QUARTERLY MEETING.

ATLANTIC CITY, N. J., July 19.—The quarterly meeting of the Association of American Portland Cement Manufacturers was held at the Hotel Shelbourn, on June 24, 25 and 26, President John B. Lober, presiding.

These midsummer meetings as a rule are not largely attended, but evidently from the very fair representation at this, more than usual interest was exhibited in the proceedings. Business was strictly of a private nature and routine matters. The executive committee met on June 24 and on the evening of the 25th, the club dinner, which is always an interesting feature at these quarterlies, was given and at which full complement of members were present. It was a most agreeable affair at which there was great geniality and pleasant camaraderie.

Percy H. Wilson, the popular secretary of the Association, always on the alert when association matters require attention, was as usual agreeably in evidence, dispensing multifariously his valuable services. During the meeting Aldrich Durant gave an interesting discourse on the concrete piles employed in the building of the great boardwalk at Atlantic City. For some reason or other there was no meeting of the sales managers held at this gathering.

The following members were present:

Alpha—A. F. Gerstel and J. W. Wight.
Alsen's—W. P. Corbett.
American—R. W. Lesley and R. E. Griffith.
Bath—George E. Roydhouse and W. W. Hoover.
Chicago—J. U. C. McDaniel.
Coplay—W. H. Harding, C. H. Breerwood and James F. Twamley.
Edison—W. S. Mallory.
Lawrence—E. R. Ackerman, L. V. Clark and R. E. Johnson.
Lehigh—E. M. Young.
Marquette—William Dickinson.
Maryland—Loring A. Cover and Harry B. Warner
Nazareth—A. W. Paige and M. J. Warner.
Northampton—J. A. Setze.
Penn Allen—W. E. Erdell and William R. Yeager.
Phoenix—William Turner, H. M. Fetter and William G. Hartranft.
Sandusky—S. R. Newberry.
St. Louis—E. Struckmann.
Superior—Justus Collins.
Universal—E. M. Hagar, B. F. Affleck, B. H. Rader and Morris Metcalf.
Vulcanite—J. B. Lober, W. D. Lober, Albert Moyer, W. R. Dunn and T. G. Barr.
Western—George S. Bartlett.
Whitehall—W. C. Kent and H. B. Green.

Lumbermen's Portland Buys Machinery.

KANSAS CITY, MO., July 19.—The Lumbermen's Portland Cement Company, whose plant is located at Carlyle, Kan., have placed the order for their grinding machinery. It consists of thirty-two Maxecon pulverizers for grinding both raw material and the finished product. Before deciding on the grinding machinery the company sent engineers to examine the working of these machines in the Lehigh Valley.

Universal Increasing Its Capacity.

PITTSBURG, PA., July 19.—The Universal Portland Cement Company are making preparations for the installing of the additional machinery in their plant near here. They have ordered fourteen Maxecon mills from the Kent Mill Company of New York. They already have thirty of these pulverizers in the various plants of the company.

Wage Increase Announced.

EASTON, PA., July 1.—The Alpha Portland Cement Company announced a 10 per cent increase in wages at the various plants of the concern recently. The order affects about one thousand men. The company says the condition of trade does not warrant the increase, but the additional pay is granted in consideration of the high cost of living.

Declare Semi-Annual Dividend.

Directors of the American Cement Company, Philadelphia, Pa., have declared the usual semiannual dividend of 3 per cent, payable July 24 to stock of record July 10.

Sales Manager For Southeastern.

S. C. McCurdy has taken up his duties actively as general sales manager of the new Southeastern Portland Cement Company, with headquarters at El Paso, Texas. The new plant has just started its operations, and is making a standard Portland cement. The officers of this company are Carl Leonardt, president; Felix Martinez, vice-president; A. Courchesne, general manager, and O. J. Binford, secretary and treasurer.

Increase In Cement Shipments.

OTTAWA, CAN., July 1.—The shipments of the International Portland Cement Company, Limited, continue to show big increases. For the year 1909 up to and including June 15 there was an increase of 32,731 barrels over the corresponding period of 1908. Shipments from the International works are running from 2,000 to 3,000 barels per day, and from present indications the deliveries of this company for the year 1909 will be the largest in its history.

Lehigh Opens New Castle Plant.

ALLENTOWN, PA., July 1.—Some 400 men, idle for the last five months, returned to work at New Castle recently, when the No. 2 plant of the Lehigh Portland Cement Company resumed operations. The company will produce 7,500 barrels of cement daily there.

Applies for Receiver.

CHELSEA, MICH., July 1.—Following a meeting of the directors of the Millen Portland Cement Company recently, a receiver was asked for the concern. The company gives its liabilities as $200,000, with $150,000 assets.

A New Eastern Company.

PHILADELPHIA, PA., July 1.—The Tidewater Portland Cement Company is being organized with a capitalization of $5,750,000, to build a plant at Union Bridge, Md., for manufacturing 1,000,000 barrels of cement and 200,000 barrels of hydrated lime annually.

Structural Materials In Oregon and Washington.

The rapid growth of cities in Oregon and Washington has caused a great demand in these states for structural materials of all kinds, and although some of these materials are locally abundant and satisfactory, others have to be brought from great distances. Common bricks, which form the principal components of most buildings, are made in the vicinity of all the cities, even within the city limits, and the supply of loam suitable for making these is very great. Gravel and sand for concrete and sand for mortar are obtained in large quantities in the immediate vicinity of the cities. Cement, however, which is so extensively used in concrete, is produced at only one place in the two states, and most of that used is brought from distant points, much of it being imported from England, Germany, Belgium and Japan. Building stones are hauled many miles, especially the kinds used for interior decorations, most of which are shipped across the continent. High-class brick, terra cotta, lime, plaster, and many other building materials used in this region are produced at distant places.

Yet the cost of most supplies that are now brought from distant places can be reduced by utilizing the local resources of Washington and Oregon. Limestone is available in ample supply for cement manufacture; building stones, even to the finest marbles, exist in some of the mountains; and extensive deposits of clay, sands, and other building materials occur at many localities near the coast.

An investigation intended mainly to ascertain the local resources of the gravel, sand and crushed rock used in concrete in Portland, Seattle and Tacoma has recently been made by N. H. Darton, of the United States Geological Survey, and a report on the work, published by the Survey as Bulletin 387, is available for free distribution. Representative samples of the structural materials were obtained to be tested in the St. Louis laboratories of the Survey, and considerable attention was given to the occurrence of limestone suitable for the manufacture of cement, many localities being visited in that connection.

The demand for building materials in the Northwest is well indicated by the fact that in 1906 building operations in Seattle involved an expenditure of $11,920,438 for labor and materials, and in 1907 an expenditure of $13,577,700. In Portland the amount in 1906 was $6,927,971, and in 1907 it increased to $9,446,982.

Mr. Darton's report gives also references to other sources of information in regard to building materials available in the region treated. Applications for the report should be addressed to the Director of the Survey at Washington, D. C.

Good Tonnage, but Prices Low.

"The conditions of the plaster trade are like those of all building materials at this time," said Mr. Williams, assistant secretary of the American Cement Plaster Company, in the office at Lawrence, Kan.

"The tonnage of plaster is very good, but unfortunately the prices are very low and in some cases, like that of Portland cement, are down to pretty close margins.

"We are glad to say that our mills are busy and we have had a trade the first six months of this year that was far in excess of the corresponding period of last year.

"The growth of the plaster business in the past ten years has, I believe, been greater than that of Portland cement. The new uses developing and changing conditions are responsible for that. The plaster board is fast replacing the wooden lath. Even now it is as cheap, and plasterers can put it on a wall as economically. It does not require the labor and when a building is plastered a cool, sanitary and vermin-proof structure is assured. The matter of insurance is also an important one in this case. By the use of plaster board and hard plaster the cost of insurance should be reduced, as there is less danger from fire. The use of plaster studding and partition blocks is also developing and with the increasing cost of lumber due to the decreasing timber supply a large field will result."

The American Cement Plaster Company have their own office building at Lawrence, from which the affairs of the company are conducted. The rooms are large and comfortable and make a delightful place for the employees to work.

New Kind of Plaster House.

There is now in process of construction and nearing completion a handsome and pretentious residence in South Seventh Street, Terre Haute, Ind., the first building built of plaster. It is owned by Mr. Kintz, a prominent lumberman of that city. Its walls, interior and exterior, porch floors, porch columns and steps leading up to the porch and steps from street to porch are all of "Kellastone," the name given to this new plastic material. The material in this residence is of milk white color, and presents a handsome appearance. It is cheap, durable, strong, sanitary, fire and waterproof at the same time, acid-proof, easy of application and beautiful.

A small house three years ago was built of "Kellastone" in Frankfort, Ind., and has stood the "weather test" perfectly. Also the walls and floors of the Farmers' Bank at Frankfort, Ind., were constructed of that material the same time the house was built, and they are in as good a condition now as three years ago.

Exhaustive tests were made in the laboratory for testing materials in Purdue University, Lafayette, Ind., which showed that the crushing strength of this material is over six thousand pounds to the square inch, and the fire test showed its heat-resisting qualities to be very great.

Edward F. Kellie is the inventor of Kellastone, and has organized the Sanitary Construction and Manufacturing Company, of Terre Haute, of which he is president. The company is now equipping its plant, and is ready for business. The day it opens its factory it will have fifty workmen, with a capacity of two hundred tons of "Kellastone" per day.

Gypsum Company Reorganizes.

COUNCIL GROVE, KAN., July 1.—The Kansas Gypsum Company of this place has reorganized and elected the following officers: Lewis Mead, president; J. J. Rhodes, vice-president; E. F. Bell, treasurer, and C. L. Hancke, secretary.

The plant is situated one mile west of Council Grove, on the Pollard farm. The holdings of the company consist of a lease on 383 acres of land. The transportation facilities are unsurpassed, being adjacent to right of way on main line of the Missouri Pacific Railway and available to the M., K. & T. road also. A switch will be put in by the Missouri Pacific as soon as the 80,000 shares of stock are disposed of. The stuff is there and stands 99.2 pure by assay.

T. L. Matkins has the contract from the stockholders to sell the shares.

For Northwestern Territory.

GREAT FALLS, MONT., July 22.—The United States Gypsum Company has purchased and taken over the operation of the mine and mill of the Mackey Wall Plaster Company. This mill has a capacity of 6,000 tons per month. It is operated by electric motors, and has two kettles each ten feet in diameter. Everything about the plant is new and of the best design, having been first operated in December, 1908. The gyp rock to supply the works is mined from a ten-foot ledge of pure gypsum, which is practically exhaustless. The market for the product of this plant is bounded by the entire Northwest, including Tacoma, Seattle, Portland, and other Pacific Coast points.

Plaster Company to Build.

MEMPHIS, TENN., July 9.—E. M. Forbes, president of the National Plaster and Material Company, awarded a contract recently to J. W. Howard for the erection of a plant at Thomas Avenue and the Union Belt Line, to cost, when completed and machinery installed, about $27,000. The company was organized several weeks ago. Some Memphis capital is interested. It will engage in the manufacture of plaster, plaster fibre and similar products.

Will Run Twenty-Four Hours Daily.

RICHFIELD, UTAH, July 1.—The Jumbo Plaster Company is making preparations to run the plant twenty-four hours daily. An electric lighting system will be installed and other necessary preparations made. By an appeal of the Interstate Commerce Commission the Jumbo Plaster Company of this city has been granted a rate for shipping its product into Seattle and other northwest coast points.

Has New Plaster Board Patents.

L. M. Rader, of New York, has secured the patent papers on a plaster board together with a machine for manufacturing it.

GREAT FALLS (MONT.) PLANT OF THE UNITED STATES GYPSUM COMPANY.

The board consists of a composition of plaster of paris or other plastic material in which is imbedded fibrous material. The board is coated on the exterior with a sheet of paper, liner or burlap. Through the board are a series of perforations, either circular or cross sectional in form.

The inventor claims that the perforations allow a key which clinches the plaster when spread and also a cohesiveness by means of similar materials being used.

Plaster Board Plant In Operation.

The United States Gypsum Company have opened a new plaster board plant at Grandville, Mich. They report a big business. They are making at this plant, under their own patent, Adamant plaster board. The United States Gypsum Company's new mill at Gypsum, Va., is reported running night and day.

Receives Contract For Plastering.

DES MOINES, IA., July 2.—W. S. Fraley has received the contract for the plastering of the interior of the new military post at Fort Robinson, Wyo., which the government is building at a cost of $600,000.

The Stone Age Plaster Company, 122 East Twenty-fifth Street, New York City, wants second-hand locomotive crane of five tons capacity; on four-wheel truck; equipped with grab or clam-shell bucket of one and one-half tons capacity; boom to cover 25-foot radius.

The N. J. Parent Company, of Chicago, has been incorporated to do a plastering and lathing business. Capital, $2,500. Incorporator: J. Scott Matthews, First National Bank Building, Chicago.

The Modern Plaster and Cement Company has been incorporated at Wilmington, Del., with a capital stock of $50,000. The incorporators are Edward McGinnes, Martha L. McGinnes, Clarence McGinnes, Surthin Chandler, all of Wilmington.

A Record Run.

John L. Jackson, of the Saginaw Sandstone Brick Company, Saginaw, Mich., sends us the factory report of a week's run ending June 19 at the plant of his company. The report is on the amount of brick turned out by one press which has been in operation continuously for six years. Mr. Jackson says that he considers this the best run he has ever seen or heard of in this country or abroad. The number of brick made each day were as follows: On June 14, 41,600; June 15, 43,680; June 16, 40,560; June 17, 42,640; June 18, 43,680; June 19, 43,680. The figures were taken from the statement rendered by J. C. Reinke, superintendent of the plant.

Big Increase In Value of Brick.

The value of the sand-lime brick produced in the United States in 1908 amounted to $961,226 and represented the output of eighty-seven plants, according to Jefferson Middleton, of the United States Geological Survey. In 1907 the output was valued at $1,225,760 and was furnished by ninety-four plants. The net decrease in the value of the output in 1908 was, therefore, $264,543.

As in previous years, by far the greater part of the total value was represented by the common building brick, whose output decreased in value from $1,030,913 in 1907 to $803,333 in 1908. There was also a decrease in the value of the front brick reported, from $188,221 in 1907 to $147,704 in 1908. Fancy brick and blocks showed slight increase in value.

The average price per thousand received for common bricks of this character in 1908 was $6.33, as compared with $6.61 in 1907 and $6.71 in 1906; for front brick the average price was $12.76 in 1908, as against $10.96 in 1907 and $10.42 in 1906. It is apparent, therefore, that while common brick has decreased in price front brick has increased.

Sold By Order of Court.

MINNEAPOLIS, MINN., July 1.—Fifteen shares of stock in the Minneapolis Sand Lime Brick Company will be sold by order of Judge H. D. Dickinson, district court, to defray the judgment entered in favor of John Zeleny, professor, University of Minnesota. Judge Dickinson found that no part of a note of $600 given by George Markham August 21, 1908, had been paid and ordered the sale of the stock that Markham had deposited as security.

Sand Lime Brick Company Changes Hands.

FLINT, MICH., July 1.—The Flint Sandstone Brick Company, Flint, Mich., changed hands on June 1, 1909, and the following are the new officers of the company: W. E. Wood, president; W. H. Little, vice-president; C. S. Mott, secretary-treasurer; H. Dalton, works manager, and J. M. Hammond, sales manager.

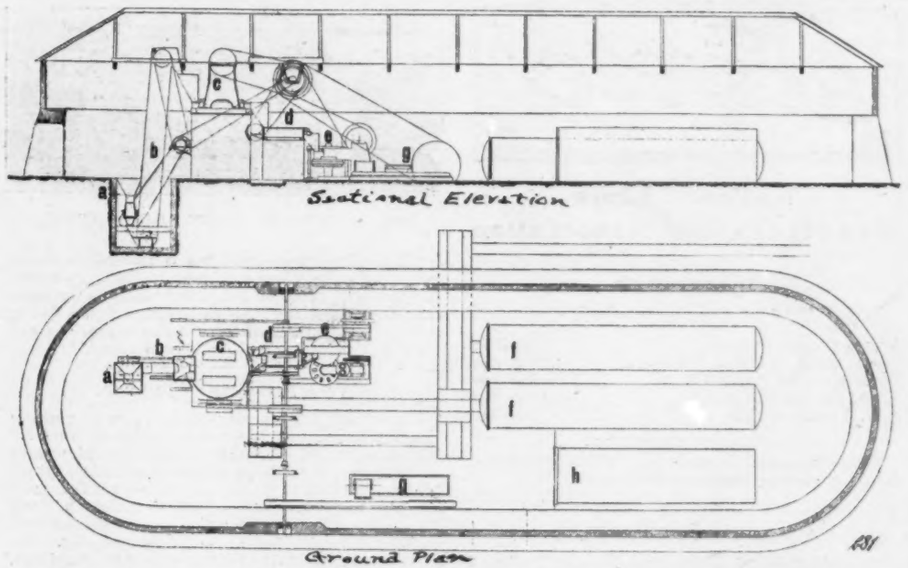
A Converted Plant.

(Translated from the *Tonindustriezeitung*, published in Berlin by J. Koehler.)

It is not sufficient for the manufacturers of the present day to carry on their business in the old-fashioned way, as their fathers and forefathers have done. Conditions have changed, and under the keen competition which is prevailing in our modern time only he will succeed who will keep his eyes and mind open all the time. We may be ever so active and inventive, but it will not pay to ignore what the other fellow is doing in our field of operation. We have to watch him and if possible profit by his experiments and ultimate accomplishments.

Enterprising brick manufacturers in this country as well as abroad have long ago come to the conclusion that it must pay to add to their yard a plant for the manufacture of sand lime brick, also the steady increase in the demand for the sand lime brick, the similarity in the process of production in comparison to the common brick, and last, but not least, the possibility of utilizing the sand layers which are more or less found in clay deposits, were undoubtedly a strong impetus.

A step farther in the development of this line of industry has been made in England according to a report of E. Leduc, of Paris. A shrewd Englishman concluded that it must work to turn his brick plant into a sand lime brick factory by the following manipulation: With the exception of the two outer walls



and the roof above he tore everything down of his plant. In the big space thus gained he put in the machinery necessary for the manufacture of sand lime brick, as the reader will see in the accompanying illustration, and which works as follows:

From the receptacle A, where sand and lime are measured and proportioned, this material is sent over by a flight of cups and the elevator B to the mixing apparatus C, where a thorough mixing operation takes place. From the outlet D the material will be forwarded to the hopper, from whence it will go into the press E. After having passed through this process, the bricks are taken to the hardening cylinders FF, where they will be hardened under the proper pressure of steam, which in turn is supplied from another installed boiler H. The driving power is generated from motor G.

All in all, the transformation of a common circular brick works into a sand lime brick plant, as the illustration shows, seems to us so well solved that the proprietor ought to be congratulated for his inventive genius.

History and Development of the Sand-Lime Brick.

From a paper by Mr. E. Leduc, director of the Building Materials Section of the Experiment Laboratory of the "Conservatoire Nationale des Arts et Métieres," in the Bulletin de la Société d'Encouragement pour l'Industrie Nationale, Paris.

In 1880, Michaelis, a German technical savant, well known by his numerous works on lime, cement and mortar, took out a patent for bricks made of lime and sand. He probably recalled to mind the experiment of a learned chemical expert of Berlin, who demonstrated by an extremely simple process that quartz, i. e., silica, is not attacked by lime in ordinary conditions of pressure and temperature. Michaelis rightly considered that, by modifying these conditions of temperature and pressure, it would be possible to produce compressed blocks proof against the effects of considerable mechanical stresses, owing to the formation of silicates binding the particles of sand. Experience corroborated his opinion. However, owing to special circumstances, the inventor was unable to turn his invention to account, and he allowed his patent to become public property. It was not until some years later that, under the influence of technicists like Olcshewsky, Guttmann, Schwartz, only to mention a few, the silico-calcareous brick industry was really established.

Economic Development.

This industry has flourished with special vigor in Germany. The number of works, which was limited to only a few, chiefly in the vicinity of Berlin, is now 208, with a production of 800,000,000 to 1,000,000,000 bricks. These figures are evidently considerable, but are merely a small part of 26,000,000,000 clay bricks, annually utilized, from 10,936 clay brick works. The greatest number of lime sand brick works is in the province of Brandebourg, where there are fifty, principally near Berlin, as compared with 815 clay brick works. The largest in the world is the Guttmann, at Niederlehme, quite close to the capital, producing about 500,000 bricks per diem. How is this development of the industry in Germany to be explained? What are the particular or local causes of it? Assuredly it is partly due to the fact that nature has less generously distributed building materials on the German side of the Rhine than on the French. Thus there is a real cause, though not so important as some would suppose, because even at Berlin or the surrounding district there were very many clay brick works before the appearance of the industry with which we are dealing, and at the present time the production of clay bricks is enormous. The German soil, then, is not so poor in suitable materials for manufacture as has been asserted. The increasing popularity of lime and sand is mainly due to the good appearance of the products and also to the ease with which German manufacturers approach new industries. It cannot be denied that the silico-calcareous brick is a product of the future, although in France the process has only developed with a struggle. Already the number of works is increasing; works are to be found at Dunkirk, Berck, Havre, Asnières, Choisy-le-Roi, Nogent-sur-Marne, Reims, Landes, and even at Paris at the Say Refinery. Outside of France there are a few of these works in England, Holland, Switzerland, Italy, and particularly the United States, where the new product enjoys remarkable favor. The adaptability of the process is really striking. It enables transformation, into merchant materials, of by-products which hitherto were rather a source of inconvenience, such as certain slags, boiler furnace clinkers, the residue from grinding plate glass, and even, as I myself saw at Woolwich, the cinders from incineration of refuse. With such materials it is easy to manufacture bricks, tiles, flags for sidewalks or lining, blocks weighing as much as fifteen metric tons and proof against the action of sea water; blocks for dams, flags for quays, white, colored or figured bricks, etc.

Chemical Constitution of Silico-Calcareous Materials.

We have seen from the Michaelis patent itself that the material in question is produced from a mixture of sand and lime treated by steam under pressure. If we analyze this product we find that it is composed of sand, lime silicate, non-combined hydrated lime and a little carbonate of lime. What takes place in this mass at contact with steam? The lime reacts on the silica, i. e., on the grains of sand, forming a lime silicate, as can very easily be demonstrated by formation of gelatinous silicate in attack with a strong acid. This is what occurs in the case of siliceous sand, like that of Fontainebleau, Nemours, Nogent-l'Artaud and other localities; but the sand employed is not generally so pure; often it is argillaceous or calcareous. If the sand is slightly argillaceous or calcareous the influence of these substances is of slight importance. If on the contrary the sand contains a high percentage it must be rejected or freed from them by washing, which is generally an expensive operation. To demonstrate this fact, I made a series of three experiments. In the first I employed Fontainebleau sand, and in the second the same sand mixed with 10 per cent clay; the third was made with the same sand mixed with 10 per cent carbonate of lime. I obtained siliceous sand, 180 kilogs. per square centimeter; argillaceous sand, 180 kilogs. per square centimeter; calcareous sand, 107 kilogs. per square centimeter. The superiority of siliceous sand is evident, good sand alone is not sufficient; the second element of the silico-calcareous material is lime. A serious problem arises for the manufacturer, viz., what kinds of lime to employ. There are, as we are aware, three varieties of lime: Fat from pure limestone, poor from sandy limestone and hydraulic from argillaceous. We have already seen that the silicate is produced by the reaction of silica on lime. Consequently it follows from the very definition of the reaction that fat lime should be utilized. Experience demonstrates the truth of the theory; in fact, it is preferable to employ the fattest possible lime, or the amount of lime must be greater, according to the amount of pure lime in the material employed, i. e., more must be used when there is less pure lime. Another point must also be considered in the use of lime, viz., its inflation or growth. In slaking, as we are aware, lime falls to an impalpable powder, the finer the purer the limestone—that is to say, that in the same quantity of lime the grains of sand will be the more completely surrounded and susceptible of being attacked by the lime according to the greater degree of fineness, i. e., fatness of the lime.

Manufacture.

Manufacture may be divided into three phases—mixture of the raw materials, brickmaking, steaming. The first of these conditions for the manufacturer anxious about his own interests and prosperity of the works is to be near a sand pit containing, as far as possible, pure fine sand. It is, in fact, useless to attempt the manufacture of these bricks without cheap sand, with the exception of some few cases. If the sand is lumpy or mixed with small pebbles, it can easily be screened on the ordinary screen employed in work yards or a mechanically-worked shaker. It can also be freed from argillaceous impurities it may contain by washing it with one of the many appliances adopted for this purpose. As regards lime, it is, as we know, prepared by first burning the stone in ordinary shaft kilns or the more or less improved kilns. The shaft kiln is so well known that it is useless to describe it. Generally, several kilns are built side by side, forming sometimes an enormous block of masonry, upon which the workmen walk about with ease to charge them. The lime removed from the base is made into a heap and watered, then put into pits, i. e., immense masonry chambers where it crumbles away in slaking. The Schöffer kiln can also be adopted, or the Perpignani Candlot, which generally requires less fuel. The characteristic of the latter furnace is a chimney running down into the kiln and a circular grating at the base, all of which enables regulation of the draught. Messrs. Pavin de Lafarge, of Teil in Ardeche, have for some time employed gas-producer kilns to avoid contact with cinders, and enabling, if necessary, production of a better burnt lime. The lime is then closely mixed with sand. To obtain a perfect mixture there are three methods:

1. Addition of sand to the slaked lime.
2. Pits in which sand is mixed with the requisite amount of quicklime in powder, watered and left to slake for a day or two.
3. The third process consists in mixing, in special apparatus, the powdered quicklime with all or part of the sand and slaking the lime with steam under pressure.

In the firt process lime already slaked is utilized, either purchased from lime burners or produced at the brick works, as is done at the Guttmann works. The chief point, long ignored, is to make the bricks from a close mixture of sand and thoroughly slaked lime. Slaking, in fact, is of preponderating interest, as can easily be demonstrated. If you take a piece of quicklime and dip it into water, it will immediately swell, burst and fall to dust, melt with evolution of a sufficient amount of heat to evaporate a considerable amount of water. Hydrate of lime is formed with a much greater volume than that of the primitive anhydrous lime, with so great an expansive force that a burnt clay brick containing a grain of lime as big as a pea, steeped in water, cannot withstand the effect and gives way under the action of the stress, developed by expansion of the lime. Slaking can be accelerated by employment of water containing calcium chloride which, as demonstrated by M. Candlot, has the property of facilitating slaking; but we do not think this process has been utilized in lime sand brick works, although it is mentioned in the Seigle patent which, as far as we know, has never been applied. To hasten slaking steam under pressure is employed in many works. The simplest method consists in filling a vat with lime under the truck on which the bricks are piled. When the truck is run into the steam-tight compartment to steam them, the lime is slaked more or less by the action of the steam. This process is little used, and it has the inconvenience of involving a somewhat considerable amount of labor without completely slaking the lime, and gives a damp product. Many apparati have been invented to slake lime. We shall say a few words about the Schulthess plant adopted in France in a number of works for various industries. It consists of two superposed boxes with a cylinder in the

upper one. This cylinder is formed by a number of round iron bars and constitutes a basket into which quicklime is run in lumps from a hopper above, the quantity varying with dimensions of the basket. Steam is then injected between the two sides of the compartment to heat it, and then hot water and steam are run through the hollow shaft pierced with openings. Under the action of steam the lime crumbles away hydrated in the lower box, where it is mixed by two screws. When slaking is finished, the lime is removed to pits, where it is left for a time. The unslaked material is drawn out by the hopper underneath. Whatever the method adopted, whether the lime is slaked at the works or elsewhere, it should never be employed unless perfectly slaked.

Second Process.

In the pit process, which has certain advantages but requires a little more complicated plant, quicklime in powder is utilized instead of slaked lime. In the previous system the sand is mixed with slaked lime which has absorbed a certain amount of water for hydration. German technicists rightly considered that it would be logical to utilize the moisture in the sand to slake the lime, which has the advantage of drying the sand, and this is very convenient in winter, when it is sometimes impossible to mix sand saturated with water. Quicklime must be produced in a fine powder. This is done with ordinary mills, jaw, ball or tube, etc. The lime powder obtained is then mixed with sand in troughs of different types, and the mixture obtained is poured into large pits and there remains for twenty-four or forty-eight hours, or even longer, when perfect work is required, to allow the sand's moisture to act completely on the lime. It is, in fact, quite evident that if the stay in pits is shortened unslaked lime will be left in the mixture and cause crumbling of the bricks during steaming. Consequently it is absolutely essential to give sufficient time for the lime to be hydrated. This is the process employed at the Guttman Works, near Berlin.

Third Process.

Finally, the third process consists in mixing the sand with pulverized quicklime and slaking it in special apparatus with steam under pressure. The type of apparatus is a vast cylinder furnished with mixing blades. It has double sides, between which the steam is run so as to prevent the heat disengaged during hydration from being absorbed by heating the cast iron. When all is hot, the amount of sand and lime required is poured inside through a manhole, which is then shut and the blades set in motion by aid of toothed gears. Water is then added, being measured in a little gauging vat above. Finally, a valve is opened to inject steam until the pressure gauge records a pressure of some kilogrammes, which is maintained for about twenty minutes. Mixing is operated by aid of two kneed blades, which continually stir and mix the mass. Some of these apparati will hold as much as 6 metric tons of materials, like that I saw in the Bremen Works. They are practical and have the highly appreciated advantage of assuring perfect slaking of lime and drying of sand, but are unfortunately expensive. The lime alone or mixed with sand being perfectly slaked, as perfect a mixture as possible must be obtained. This operation can be divided into two parts, like that of crushing, viz., preparation and finishing. To prepare the mixture, any of the machines described can be adopted, or a simple conveyor trough in which—instead of a screw—two shafts armed with blades revolve in opposite directions. In most cases mixers with vertical millstones are adopted, excellent as finishers, and which can easily be placed immediately above the presses. To obtain a continuous mixer, preparer and finisher, it is preferable to select the vertical millstones, about which we shall speak later. The attention of manufacturers cannot be too forcibly directed to the importance of a good mixture, a point which is often ignored. Evidently, if in a product containing so little lime half of this lime is in lumps, as I have found it more than once, an extremely poor mixture will be obtained—porous, without resistance and affected by frost. Not only will this product be of inferior quality, but also, if by chance there are any grains of unslaked lime, the lumps will have full play, under the action of steam, to disintegrate the brick and make it unsalable. Consequently, to obtain a perfect mixture, there should be no hesitation in adding finishing mixers to complete what the first has roughly executed; for if manufacture of silico-calcareous bricks is of extreme simplicity, each phase of manufacture enters largely into the final results, and success can only be obtained by neglecting none of them.

The Tri-City Sandstone Brick Company, Moline, Ill., certifies to dissolution.

Lime

National Lime Manufacturers' Association

Meets Semi-Annually.

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Up-to-Date Southern Plant.

The adoption of heavy concrete construction by all manner of manufacturing concerns is a leading feature of the times. In this the lime industry is by no means to be counted in the rear. Practically all of the newly built plants that have gone up in the last five or six years have employed mass concrete to a very great extent. In this connection we are illustrating several views of the works of the Gager Lime Company, located at Sherwood, Tenn., thirty miles west of Chattanooga, on the Nashville, Chattanooga and St. Louis Railroad. The plant is much observed

GAGER LIME COMPANY'S PLANT FROM RAILROAD.

and admired by travelers, as it stands out in bold relief against the mountain scenery. Another view shows the winding staircase of concrete connecting the drawing floor with the firing floor above. Both of these floors are of concrete, as is the commissary building, the subject of another picture, which the lime company operates for the accommodation of its employees, as well as the surrounding farming community. White or marble lime for the Chattanooga market is produced at this plant; in fact, all of the limestone deposits of East Tennessee are of the crystalline type. Every part of the equipment of the Gager plant is in keeping with those portions shown in our illustrations, and the concern enjoys a very extensive patronage of building contractors of Chattanooga.

Hydrated Lime Uses Increasing.

"Hydrated lime is growing in favor every day," said W. B. Hill, president of the Ash Grove Lime and Portland Cement Company, Kansas City, Mo. "The uses of hydrate are increasing as well as the number of its users. There are today more dealers in builders' supplies handling hydrated lime than ever before. Those who have never carried it in stock are now awakening to the advantages of having a material that is handled in bags, which will not air-slake, and which can be handled more economically than the lump lime. The large contractors are realizing the advantages of hydrate and are using it in preference to the lump lime. There are new uses for this form of lime being found all the time. For instance, as a means of sanitation in houses and homes. In this part of the country we have been troubled with the floods. Water has been high and in some localities reached the houses. If, after such floods, people

THE COMMISSARY, GAGER LIME COMPANY.

would use lime, they would find it purified the rooms and would prevent vermin. There are numberless uses to which lime could be put, and hydrate is the most convenient form for the consumer. If the dealer would take advantage of these opportunities, he could work up a profitable trade in hydrated lime."

Water Softening With Lime.

The use of lime for the purpose of water purification has become one of the most important fields for the lime industry. There are a number of cities whose water supply is subjected to lime purification, principal among which is the city of St. Louis. This process has been described at various times in ROCK PRODUCTS. The city of Toledo is at the present time building a water reservoir to supply that city. The system to be used is similar to that of St. Louis. There are numerous other users of water systems, principally among private corporations whose plants are so situated that the supply of water is a serious question, that have been obliged to install water-softener plants to supply their works.

The railroads as a rule have been slow to adopt lime purification of tank water, but those that have declare that it always gives good results. In all such cases lump lime has been used, probably because the hydrate manufacturers have made no especial effort to push their product for this class of trade.

J. A. McFarland, chemist, Security Building, St. Louis, has always advocated the use of hydrate for water purification, though he had difficulty in persuading its use for railroad purposes. This objection came principally from the men on the road who had to handle the product, but finally he overcame this objection and had the hydrate put into use on one extensive railroad system. He has to say regarding it:

We are more than pleased with the use of hydrate.

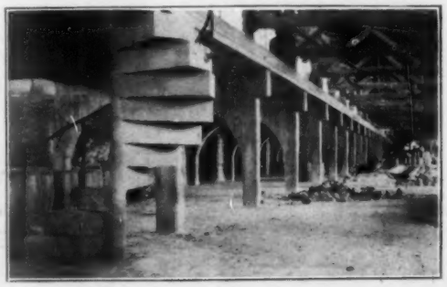
We have used hydrated lime at all of our water softening plants for about two years and find that we are enabled to get a much more uniform treatment, due to the fact that the hydrated lime contains no grit or unburned limestone and practically no air-slaked lime. Thus a large loss due to air slaking of the lime during storage at our various plants is prevented. This last is an extremely important feature, as this formerly was a great source of trouble and loss to us, especially as a new lot of lime is usually piled on top or in front of the lime still in storage when a new lot is received. We tried to prevent this, but it is very hard to get the men to move the old lime out before the new lime is unloaded in the lime house, and so our loss in this respect was formerly quite great. Also a large loss was occasioned, due to the air slaking occurring in transit.

The grit and unburned limestone caused us lots of trouble and expense by clogging up and wearing out the pipes, jets and pumps used in conveying the chemicals to the tanks of water to be treated.

So taken all together we figure that the use of hydrated lime is much more economical and we are obtaining much better and more uniform results by the use of the same.

Lime Plant Burns.

CALERA, ALA., July 1.—The Stein kiln, situated about two miles north of Calera, on the Louisville & Nashville Railroad, was destroyed by fire recently. It has been operated for a couple of years by W. H. Moss, of this place. The loss is estimated as follows: Stores, $300; 1,000 barrels of lime ready for shipment in a car. The plant is a total loss. No insurance.



CONCRETE WORK IN PLANT OF GAGER LIME COMPANY.

Erect New Lime Plant.

MARTINSBURG, W. VA., July 1.—The Blair Limestone Company has incorporated and begun the erection of their proposed plant. They will have thirty-two limekilns, located two miles east of Martinsburg, on the Baltimore & Ohio Railroad, and will also supply fluxing stone to the Jones & Laughlin Steel Company, Third Avenue and Ross Street, Pittsburg, Pa., for their steel plant. The lime plant will cost $300,000 when completed.

Will Manufacture Lime.

WOODSBORO, MD., July 15.—S. W. Barrick Lime Manufacturing Company recently incorporated with $25,000 capital stock, will erect a $20,000 frame building and equip it with machinery costing $5,000, to manufacture lime; 250 tons daily: S. W. Barrick, president; L. C. Barrick, vice-president; O. S. Barrick, secretary-treasurer.

An Historic Lime Quarry.

It is a question if many of the thousands of people of Chicago who mornings and evenings pass, in the South Halsted Street cars, the high fence at Twenty-seventh Street running several blocks south, enclosing the oldest lime quarry in the state, know what is inside that fence.

Yet that lime quarry has been there for over seventy-five years and thousands upon thousands of tons of limestone have been blasted out of it during this time of over three-quarters of a century. It furnished, in years gone by, the only lime that was used in the city of Chicago and possibly in the state.

The bottom of the quarry today is about three hundred feet below street level, and it is a strange sight indeed to stand on the edge of the quarry and look down on men working there who appear no larger to the eye than little children.

An incline on which small truck cars are run from the bottom of the pit to the lime kilns are used to hoist the broken limestone to the lime kilns a few feet from the edge of the quarry and further are used to let workmen down to the bottom.

It looks like dangerous riding, men sitting on the edge of these little truck cars, or sitting on a load of limestone in the cars, but they do not seem to mind it at all. They are all rugged, cool-headed fellows, with lots of brawn and muscle and nerve.

Superintendent Healy, of the lime quarry, who has had charge of it for about fifty years, one morning came from the bottom of the pit seated on a load which filled the car, stepped off as it stopped at the end of narrow stairs running down from the edge of the quarry about thirty feet, walked up these stairs without banisters as unconcernedly as walking upstairs in his home, which certainly was "going some" for a man at least 70 years old. He is one of the oldest residents in Chicago and possesses the ruggedness and sturdiness of the "old timers" of Chicago.

The Stearns lime from this quarry has been favorably known for its quality for over fifty years, but it is safe to say that the thousands of people going to and coming from work in the Halsted Street cars know little of this lime and less about the quarry, which has become historic as the one which furnished the first stone used in the city.

Lime Company Starts Operation.

RAVENA, N. Y., July 1.—The Ravena Lime Company recently started shipping lime. The first move toward the completion of the present up-to-date manufacturing plant was started last fall, when B. M. Young, of Brooklyn, bought the abandoned plant of the Harcourt Lime Works, just north of Ravena. Since that time Mr. Young has removed a finely equipped and modern hydrated lime making plant from New York City to Ravena.

The present plant consists of two large top feed kilns, tracks, tramway, hydrating machine and sacker, besides the other necessary appliances for the rapid blasting, conveying, burning, sacking and delivery of the lime.

W. M. Young is the proprietor of the present plant, which represents an investment of $25,000. The capacity of the hydrator is three tons per hour. All the lime is sacked. C. A. Seward is superintendent of the plant at Ravena, Mr. Young being a wholesale dealer in building materials with offices in Brooklyn.

Will Equip Quarry in Kansas.

CHANUTE, KAN., July 7.—John T. Rustamier has purchased ten acres from the Hammond tract west of the city for a quarry. Mr. Rustamier has taken the contract for furnishing Al Abrams of Iola with crushed rock for the fourteen blocks of macadam. Mr. Rustamier has his own crusher and expects to be ready for business in a short time.

QUARRIES

Install New Crusher.

DETROIT, MICH., July 10.—Engineers are at work on plans for improvements at the crushing plant of the Michigan Alkali Company. The demand for the output from the plant has increased to such an extent that the plant must be enlarged.

A year or two ago, when the giant crusher, the largest one in the world at that time, was installed, a new addition of steel was constructed. The plans now being made provide for removing all that is left of the original wooden building, which will be replaced by steel, in which will be housed another giant crusher and the equipment which the installation of such a crusher requires.

Plans are also being made for lowering the quarry twenty feet. The present depth is fifty feet, which is below the level of the lake. A new steam shovel will be put in to meet the requirements of the increased crushing capacity.

Business Conditions Normal.

COLUMBUS, O., July 1.—W. O. Taylor, general manager of the Casparis Stone Company, says that the quarries of the company at Marble Cliff and Arlington are practically back to normal and in some departments are ahead of normal. There is a steady increase in the demand for the quarry products and while the local quarries are not yet up to the boom period of 1907, yet the western and southern plants of the company are now the busiest in their entire history and it is believed that it will not be long until the Ohio quarries are in the same condition.

Will Move Rock Crusher Plant.

BEATRICE, NEB., July 9.—The Rock Island Railroad Company has decided to move its stone crusher plant from Rockford, this county, to some other point on the road. It was found that the quality of rock taken from the quarries of the company was not suitable for ballasting. The company located the plant there several years ago and at that time purchased a tract of twenty acres. It spent about $15,000 in erecting buildings and buying machinery.

Receives Contract to Build Road.

FREMONT, OHIO, June 23.—The county commissioners have awarded to M. P. Hannin, of Toledo, the lowest bidder, the contract to improve the Garvin road in Riley township, the first Sandusky county road to be improved under the Garrett law, which provides that the township pay two-thirds of the cost and the abutting property the other third.

The improvement will be a ten-foot stone roadway for a distance of three miles with a dirt road on the side. Hannin will do the job for $11,836.70. Stone from a quarry at Castalia will be used.

Damage By Fire.

ALEXANDRIA, IND., July 10.—The plant of the Banner Rock Products Company was the scene of a threatening fire recently and was almost totally gutted. One department was wrecked, entailing a loss of between $5,000 and $7,000, only a part of which was covered by insurance.

Receives Contract For Paving.

BURLINGTON, IA., July 1.—The Burlington Quarry Company has been awarded the contract to pave six blocks on Fourth Street, in Ft. Madison, between Barnes and Spruce Streets. The pavement will be of crushed rock, finished with a top dressing of tarvia or asphalt filler. The work will be undertaken at once.

Leases Tract of Land For Quarrying.

COLUMBUS, OHIO, July 10.—The Casparis Stone Company recently filed in the recorder's office a lease given it by the Columbus Iron and Steel Company, covering 137 acres of land located near the Casparis stone quarries. The lease runs for fifteen years and the stone company is given the right to quarry all the stone it can. However, the Casparis company agrees to quarry not less than 125,000 tons per annum, and it agrees to pay 2 cents for each net ton taken from the quarry, and $450 a year in addition. It also provides that a railway switch may be laid to the quarry.

Progress In Missouri.

Curtis Hill, state highway engineer, Columbia, Mo., makes the following statement with regard to the good roads movement of Missouri:

Missouri has held a sort of desultory interest in roads for several years, as evidenced by the records of road associations for the past fifteen or twenty years. They represent the pioneer organized efforts for road improvement in the state. However, it was through the efforts of George B. Ellis, secretary of the State Board of Agriculture, that the board was induced to make a systematic state campaign, under Mr. Ellis' direction, for better roads and the supervision of road work by trained men, and which resulted in the laws of 1907 for a state highway engineer and a county highway engineer for each county.

This interest in the road movement has been maintained, and much interest is being shown this year. It is of a local nature, the state engineer's services being in an advisory capacity and the county engineers having supervision of the roads and road work. Of two amendments to the state constitution submitted to the voters last fall, one for state aid for road work and the other for an increased local road tax, the local tax amendment was carried. The county authorities are applying all or a part of it this year. We have a law whereby county courts may duplicate, out of the public road funds of the county, any donation made for road improvement.

AFTER A BLAST IN THE JAMES & A. C. O'LAUGHLIN QUARRY AT BELLWOOD, ILL.

As further evidence of a good public interest, private donations have been made this year to an extent that many of the counties have not the revenue to meet one-half of them.

The general improvement of the roads in the past year is very marked, [illegible]ally more so in some counties and in some commun[illegible] than in others. Some of the wealthier counties a[illegible] expending large sums for hard roads and surface i[illegible]ments, while there is a general trend of sentiment [illegible] work of a permanent nature. About $3,000,000 wa[illegible]pended upon the highways of the state during the yea[illegible],008, and it is safe to say that the expenditures for [illegible] will amount to $3,500,000. The laws for engineering supervision are resulting in a better administration of road affairs, and the people are beginning to show a willingness to entrust the road work to road men, an appreciation of the knowledge of road building, and, above all, a better appreciation of good roads.

An Electric Driven Well Driller For Making Large, Deep, Blast Holes.*

There has been some demand for a portable blast hole drilling machine, operated by an electric motor, instead of boiler and engine. Where blasting operations are conducted within city limits some inconvenience and a large item of expense are represented in providing a licensed engineer, as required by law, for each separate steam driven machine. There is also economy in generating all power at a central plant. In some locations it is impossible to use the boiler. To avoid this some contractors have operated a series of machines from one centrally located boiler, carrying steam lines to the several machines. Some have used compressed air in the same way, as was done in the extensive blasting operations on the low grade cut-off of the P. R. R. But this involves the constant relaying of steam or air lines, with bother and loss of power from condensation, leakage, etc. The motor-driven drill was designed to obviate these and other disadvantages connected with the steam machines as used on certain classes of work.

The Keystone electric driven machine, recently tried out at the James and A. C. O'Laughlin quarry, at Bellwood, near Chicago, was equipped with a 10 h. p. specially geared motor placed over the rear truck of the machine and belted to the drilling mechanism. (See illustration.) The drilling mechanism is back geared and balanced so as to run light and smoothly.

The controller box is placed at the drill operator's hand, in front, as shown in the illustration, along with the other levers which regulate and control the various operations of drilling. The manipulation of the motor is very simple and the ordinary drill man will become thoroughly competent to handle it with a few minutes' instruction from the electrician. The laying of feed wires and other like adjustments will be looked after by the electrician in charge. One man can easily handle the machine without assistance, except when sand-pumping or moving the rig to a new hole. This is another saving on the cost of operating the steam machine, which requires the constant attention of a fireman, besides the driller.

The motor, drilling mechanism, derrick, etc., are all unified in a machine which is moved from hole to hole in its entirety. For short moves the derrick is not taken down.

*By the Advertising Manager of the Keystone Driller Company, Beaver Falls, Pa.

At the full speed of the motor the drilling tools drop about sixty strokes per minute, which is ample in all cases to obtain the maximum drilling speed. As the hole becomes deeper or clogged with cuttings, before sand pumping, the rapidity of the stroke is gradually reduced to say fifty strokes per minute, in order that the cutting bit may deliver its blow with best effect. This can be done by reducing the speed of the motor.

The drilling tools used with this outfit comprise a stem, weighing about 1,000 pounds, drill bit of 150 pounds, and a rope socket of about 50 pounds, or about 1,200 pounds in all. The bit cuts a 5⅝" hole and the stem is 3¾" in diameter and 22' long. The stroke being from 30 to 36 inches, a blow equal to about 3,000 to 3,500 foot pounds can be obtained at each stroke. This is sufficient to cut a 5⅝" hole very rapidly through any formation.

Best results have been obtained, in blast hole drilling with the 5⅝" hole. This size obviates the necessity of "squibbing" charges, which must be employed in the smaller holes. It is also more easily and cheaply drilled than a hole of a larger or smaller diameter. The larger hole involves more cutting, while permitting no corresponding advantage in size and weight of drill bar; the heaviest practicable tools can be operated in the 5⅝" hole. On the other hand, a smaller hole necessitates a reduction in the diameter and weight of the stem and bit, which detracts from their efficiency. It has been proved experimentally that a 6" hole can be drilled more quickly and cheaply than a 3" hole.

The results of the test at the O'Laughlin quarry were as follows: The machine was set up Saturday evening, June 5, 1909, at 5 o'clock and began drilling. It was operated for one hour, during which 9 feet were drilled in fairly hard limestone. From this time until the following Friday forenoon four 66-foot holes, 5⅝" in diameter, were drilled, the work being done without a hitch and without the necessity of any change whatever in the machine. In the following week were drilled four holes 105 feet in depth, the machine running ten hours a day in all cases. The record of a similar machine at Racine, Wis., in slightly harder rock was 900 feet in 200 hours, including all stops and delays in moving machine.

We consider this a remarkably successful test and a very satisfactory demonstration of the practicability of electric driven well drills. The machine was more or less of an experiment, nothing of the kind having been tried before.

The Keystone Driller Company had guaranteed the machine to drill to a depth of 60' at the rate of 40' a day of ten hours, or 4' an hour. The purchasers of the outfit now advise that it is drilling 5' an hour, including all stops, which must be regarded as a very good showing in hard rock. This is probably equal to the results obtained with the best steam machine, under the most favorable circumstances. The advantages of the steam machine in variability of speed and reversibility of engine seem to be not very great.

This machine is built with gear hoist, capacity 500', or with friction hoist, capacity 350'. The latter style is probably the better for quarry and cut drilling, where the tools are being constantly raised and lowered, as in tamping in a charge. (One driller reports that he raised and lowered his tool 900 times in one day, when tamping dynamite charges in four holes.) The holes will rarely run over 150' in depth. The machine is also made with traction attachment (for self-propulsion) and, while it is impracticable to move it over great distances, on account of carrying along the electric feed wires, for short moves from hole to hole, or from one side of the quarry to the other, it is a great advantage. The delay in waiting for a team of horses is saved, as well as the expense. For short moves the self-braced derrick is left standing.

THE KEYSTONE DRILLER OPERATED BY ELECTRIC MOTOR.

The advantage of large, deep blast holes in saving "squibbing" charges has been referred to. Another advantage is that the holes can be sunk from the surface to a point a little below the base of the breast, no matter how high the face of the quarry. A heavy charge is then placed at the bottom and the whole breast is lifted out at one discharge, without the necessity of stoping and cleaning up at various levels.

An illustration herewith shows results obtained from the simultaneous discharge of four holes 5⅝" in diameter and 66' deep. The manager of the quarry states that 20,000 cubic yards of stone were thrown down by this shot. The explosive consisted of 5,500 pounds of dynamite packed solidly in the holes to within 25' of the top and tamped with screenings.

The effectiveness of the blast is greatly enhanced by drilling the holes properly. The large holes allow the powder to be well bunched at the bottom.

Generally the machine is used for loading the holes. For this service the regular drilling bit is removed and in its place a wooden rammer is placed on the drill stem. Five to eight sticks of dynamite having been dropped into the hole, the drilling tool is lowered after them, forcing them into a compact mass at the bottom. The tools are then withdrawn and the process repeated until the hole is filled within 25' of the surface. At this point the exploding caps and wires are inserted and the holes packed full of sand and gravel to the top, by hand.

Some conception of the quantity of material thrown out by such a blast may be gathered from one of the photographs shown herewith. From the base of the breast to the workmen scattered about the edge of the debris is a distance of about 200 feet. The breast is 105' high. In this case the holes were put down only half way, though the engineer in charge states that they might as well have been sunk to the bottom, and in the future this will be done. It will be noticed that there are a few large chunks in the debris which will have to be drilled and blasted, but nearly all is in condition to be handled by the steam shovel and taken at once to the crusher.

The net price of such a driller is slightly less than $1,000.

Another one of the illustrations shows the result of a shot made in a similar way at the quarry of James & A. C. O'Laughlin, at Bellwood, Ill. Four holes, 95 feet deep, 25 feet apart, and 25 feet from the face of the ledge, were sunk. Fifty-five hundred pounds of Ætna 40 per cent powder were used. The holes were filled to within 40 feet of the surface and packed with screenings. It was a very difficult shot to make on account of being in the corner of the quarry, where the strata of the rock were wedged, and which increased the strain of the material coming out from the face. On account of the strength of the rock in the ledge and the fact that the screenings were not tamped, the bottom was blown out, leaving the top stone in the ledge, which afterward had to be blown out with 400 pounds of powder. The work for this shot was under the direction of Superintendent W. P. Collins.

QUARRY OF BEAVER (PA.) STONE COMPANY, SHOWING RESULT OF MAMMOTH BLAST.

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WAR DEPARTMENT
ENGINEER OFFICE, UNITED STATES ARMY.

Nashville, Tenn., February 20, 1909.

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Dear Sirs:—Replying to yours of the 12th instant, I beg to advise you that our records show that 22,250 barrels of Kosmos cement were received at Hales Bar, Tennessee River, for the lock under construction at that point, between June 23 and September 25, 1908. All of this material was tested and all of it accepted under the requirements of the Engineer Department specifications.

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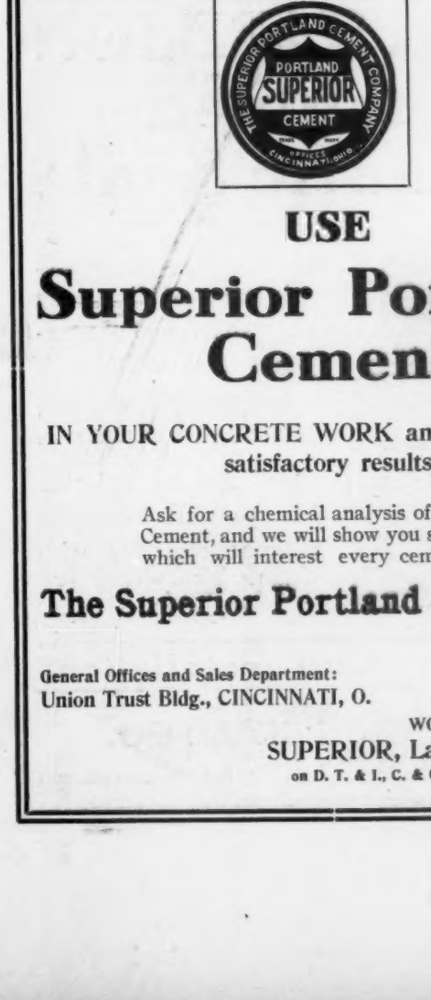

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CONCRETE ENGINEERING

Opening of the Hudson River Tunnels.

One of the greatest events, if not the most remarkable, in the history of modern engineering, was the opening on Monday, July 19, of the twin tubes of the Hudson & Manhattan Railroad, connecting the Cortlandt Street terminal of that company with the Pennsylvania Railroad station in Jersey City. Over four years and a half were required in the actual building of the tunnels, and seemingly impossible obstacles were overcome only by an immense amount of careful planning and labor. An almost incomprehensible quantity of material was used in construction, the amount of giant cement alone totaling hundreds of thousands of barrels, and nearly $60,000,000 capital, raised from private sources, was expended, at the rate of $1,250,000 a month, for labor and material. As an engineering feat, the undertaking was colossal, even greater, when modern facilities are taken into consideration, than the building of the Brooklyn Bridge.

The opening of the tubes was the occasion for a very demonstrative holiday on the part of a large number of the population of both Jersey City and Manhattan (principally "on the Jersey side"). A huge celebration was in progress all day and a good part of the evening, and speeches were made by members of, or those interested in, the Hudson & Manhattan Railroad. About 2,000 invitations were issued, and a number of persons prominent in Eastern affairs were among the guests. At 10:15 a. m. Miss Harriet McAdoo, daughter of the president of the road, in the center of the terminal concourse and surrounded by the expectant assembly, pressed a gold button that sent the electric power, by which the steel cars of the road are run, into the wires underneath the Hudson. This accomplished, President McAdoo and his guests crowded into the four special trains that were waiting, and the initial run in the first train to Jersey City was was made in the time of 2 minutes and 40 seconds. At the Jersey terminal an enthusiastic welcome was in store for the party. The city was decorated as for a national holiday fête, and the crowd assembled signified their approbation of the proceedings by all manner of demonstrations.

Before a grandstand the length of a city block the speeches were delivered. Mayor Wittpen, of Jersey City, gave an interesting talk on the subject of interstate corporations, which was followed by the reading of a letter from President Taft, in which the tunnels were commended and regrets at his not being present were stated. Following this, Mr. McAdoo spoke feelingly of DeWitt Clinton Haskins, who first planned tunnel transportation between the two cities. He then made a few remarks concerning the history of the undertaking, and showed the necessity of coöperation between the railroad and the public in general, choosing as the company's motto: "The public be pleased."

The men who promoted the financial side were given all due praise, as were the members of the engineering staff, Chief Engineer Charles M. Jacobs, J. Vipond Davies, S. B. Stillwill, Hugh Hazleton and John Van Vleck. Mr. Jacobs said that the only competitor that could be foreseen for a number of years would be an aeroplane concern, and briefly stated his admiration of the bravery of the tunnel employees, numbering at some periods 8,500 men, and the hardihood with which they had withstood work in the caissons.

At 3 o'clock in the afternoon the tubes were opened for regular business, and a regular schedule of trains, every two and a half minutes during the day, was placed in effect. Needless to say, the road did not starve for passengers during the remainder of the day. The transverse line between the Pennsylvania Station and the Erie and Lackawanna Depot, and the loop from Thirty-third Street and Sixth Avenue to the Grand Central Station (the last links in the McAdoo tunnel system) will be completed and opened to the public by August 2.

A Reinforced Concrete Warehouse.

NEW YORK, N. Y., July 10.—The Turner Construction Company has been awarded the contract for the construction of a reinforced concrete warehouse for L. M. Palmer. The building will be 97'x54', six stories and basement. It will be located at Vine and Doughty Streets. The architect for the work is D. B. Probost.

STRUCTURAL TILE.

Wonderful Growth and Popularity of This Newest and Best Building Material.

YOUNGSTOWN, OHIO, July 19.—Here is located the head center of the thriving new branch of the concrete industry known as the structural tile business. The inventions of A. A. Pauly, of the Concrete, Stone and Sand Company, have resulted in the establishment of a very large plant to manufacture tile adaptable for all kinds of building purposes. The concern is now turning out the material by the hundreds of thousands, and a practical revolution of building ideas has taken place. At no less than thirty different sites in this city and the surrounding towns are large quantities of concrete tiles now being used in building work. They are equally adaptable for all classes of building, for outside walls, partitions, foundations, floors, and even for roofs. In fact, no building job, it seems, can be undertaken without considering this new material and consuming some of it in one way or another.

Aside from this, the machinery for manufacturing this kind of goods is built here exclusively, under direct supervision of the inventor, and full equipments for extensive plants have been furnished to manufacturers in all parts of this country, including New York, Chicago, San Francisco, Waterloo, Iowa; Washington, Rochester, and several others. Very recently an outfit of thirty-five tile machines went to Buenos Ayres, in Argentina. The same popularity that has been attracted by the merits of the material here has followed it wherever introduced. This has been amply proven by the fact that every concern that undertakes the business of making this kind of tile invariably decides to extend and increase its business by adding more machinery.

All the leading architects and engineers who have examined this type of concrete structural tile are attracted by its merits, and promptly pronounce it a radical improvement that has been long needed in the structural world. All the edges, corners and surfaces of the material are perfectly straight and true to the straight edge and the square. It is fireproof and waterproof as near as these desirables can be obtained in any material, and practical demonstrations have developed that they are very economically handled at the job. The new material is also popular with all the mechanics who use it in practical building work—the plasterers, especially, pronounce walls and ceilings made of concrete tile a long ways the best surface for laying on plaster that they have ever known.

An illustration herewith shows a type of residence that has become popular here since the introduction of concrete structural tile. Quite a number of houses similar to this one are now being built. They cost no more than a frame house, and are conceded to be far better from every standpoint. In some cases very elaborate and attractive exterior plaster work is added as a finish to this kind of tile construction, making an extremely rich and striking finish—in fact, anything that can be designed and modeled can be used in this way. It is considered to be the building wonder of this advanced age.

POPULAR TYPE OF MODERATE PRICED RESIDENCE MADE OF CONCRETE STRUCTURAL TILE.

Barge Canal Work Progressing.

SYRACUSE, N. Y., July 17.—The removal of 100,000 cubic yards of rock a month in one locality and one dredge pouring out 9,212 cubic yards of dirt a day in another are some of the feats on the barge canal work reported after an inspection yesterday. The placing of 600 cubic yards of concrete in a day at one plant is another accomplishment of modern methods.

The inspection was one of those frequently made by Frank M. Williams, state engineer and surveyor, and members of the Advisory Board of Consulting Engineers. With Mr. Williams was Deputy William B. Landreth, M. G. Barnes of the Advisory Board, Division Engineer Guy Moulton and Resident Engineer Frederick Wagner. They went to Three Rivers, up the Oneida River to Brewerton and to Sylvan Beach, and back to Syracuse. Mr. Williams left the party at Oneida. They inspected the work being done by the Stewart-Kerbaugh-Shanley Company on contract No. 12, that being done by Scott Bros. at Coughdenoy and that at Sylvan Beach.

"The work is progressing satisfactorily at all points," said Mr. Landreth, "and at many places rock is being excavated a month, and the big dredges at Brewerton and on the Oneida river cut-offs are all doing good work.

"The contract of Scott Bros. for the lock at Baldwinsville will probably be completed this fall. Contract No. 4 at Sylvan Beach will probably be finished by fall. The contractors have four miles of the canal east of Sylvan Beach practically completed now, and they are putting on the concrete top of the sea wall. Two big dredges are at work there."

The Stewart-Kerbaugh-Shanley Company, which has contract No. 12, extending from deep water in Oneida lake west to Mosquito Point, is working on four cut-offs on the Oneida river, at Brewerton and at Jacks Reefs. At Jacks Reefs the course follows the old state ditch which passed around the reefs. The company is using two big ladder dredges, a big hydraulic dredge and steam shovels on the Oneida river and Brewerton section. The work has not yet extended to Three Rivers, but is being carried on at the Peter Scott, Oak Orchard, Brewerton and other cut-offs or bends in the river.

The use of concrete in the locks, Mr. Landreth said, makes progress much faster than would be possible if masonry were used. In some instances, he said, 600 cubic yards of concrete are laid in a day. Not half of that amount of masonry, he said, could be put in if the work were covered with men. Another advantage is that the construction costs less.

Latest Development in Sewer Construction.

(Continued from Page 3.)

The advantages of reinforced concrete pipe are that they are cast in sections and made so that they can be examined before being lowered into the trenches. By this means, the engineer in charge may carefully examine the pipe before it is set, and he may reject such as do not pass the specifications or requirements. Various cities are now using reinforced concrete piping made in this way, among which may be mentioned St. Paul, Minn. and Waukegan, Ill., South Bend, Ind., Marshall, Ill., and Shelbyville, Ind.

In order to give the concrete fraternity the best information on this subject, the engineering department of ROCK PRODUCTS has investigated this means of sewer construction.

A staff representative recently had the opportunity of visiting the scene of operation where concrete sewer pipe is now being made and put into use.

The city of Waukegan, Ill., has not been slow in adopting this form of construction, and has four miles of sewerage system now in process of building.

Waukegan is situated on Lake Michigan, thirty-five miles north of the city of Chicago. This is the oldest of the lake cities, and was one of the first settlements on the west shore of the lake. It is an ideal location for a city. It lies high on the hills back of the lake. In the past few years this city has grown very rapidly. The residence portion has extended farther west, and into that part of the country which is lower than the business portion. To provide proper sanitary conditions, it has been necessary to install a sewerage system. On account of the new portions of the city being lower than the older part, an entire new system has to be installed, the levels in some of the old parts being higher than the later built up sections.

After careful investigation, it was decided by the Board of Improvements to construct the new system of concrete. Figures were taken on the various kinds of construction, and it was found that this was by far the most economical form. The work of improvement is under the supervision of the city engineer, B. P. Thacker. The present contract calls for about 19,000 feet of sewer, and before it is finished it will amount to four miles in all. The total cost of this will be in the neighborhood of $100,000.

The general contractor of the work is H. D. Hallett, of Aurora, Ill. He is a man well known in concrete construction work, and he has given considerable time to sewer construction. This sewer will carry sewage from the residence portions in the west end of the town to the lake. The course is through the streets which are not yet paved and into a deep ravine which crosses the Chicago & Northwestern Railway. It is the intention to improve by a park that part of the ravine where the sewer is now being constructed. It will have a driveway and eight hundred feet of concrete sidewalks. The natural scenery being preserved, will make an ideal park. The sewer through the ravine is above ground, while after it crosses the Northwestern tracks it is sixteen feet below the surface.

MANUFACTURING REINFORCED CONCRETE PIPE FOR THE WAUKEGAN, ILL., SEWER. ALL THE WORK IS DONE ON THE GROUND.

At the point shown in the picture the pipe is being laid in hardpan, which is apparently dry. The contractor did not encounter any water here, and conditions for laying the sewer are better than are ordinarily expected.

Mr. Hallett stated that he did not expect to find such a condition, and in fact the course all through the ravine was entirely different from what he expected to find. For this reason he thought the concrete pipe the best means of construction, as it has been found more economical to lay a pipe in places where there is a continual flow of water, rather than in a dry place. At some stages it has been very dry, and no doubt in places it would have been more economical to have cast concrete in forms in the trench. This has equalized itself, however, by the difficult places that had to be passed. In this particular sewer the reinforced concrete pipe manufactured by the Reinforced Concrete Pipe Company, of Jackson, Mich., has been used. All the pipe are made on the ground under the supervision of that company. They have their own men in charge of the work, and deliver the pipe to the contractor. The men in charge of this work for the Reinforced Concrete Pipe Company are: Wm. Donahue, F. K. Webb and W. B. Cunningham, all being experienced experts in this particular branch of concrete work.

The main sewer is made of 60" pipe. The pipe is cast in three-foot sections. A novel and efficient system of reinforcement is used in this particular piping. The versatile and flexible triangle mesh reinforcement, manufactured by the American Steel & Wire Company, was adopted in place of movable steel bars. There are also four vertical steel bars, which have hooks in the end for engaging the circular jointing band. The form for the pipe consists of steel mold into which the bars have first been placed and into which the wire reinforcing fabric is fastened. Each three-foot section requires twenty-seven feet, or one cubic yard of concrete, and eighteen feet of reinforcement. The concrete is cast very wet, by pouring. The aggregate is composed of Universal Portland cement and sand taken from the beach at Waukegan, together with crushed rock from the quarries at Racine, Wis. All of these materials are supplied to the pipe company by F. Bairstow, of Waukegan, who is a leading operator in builders' supplies of that city. The results obtained in the concrete work have been very satisfactory, and the tests of the engineers show that the cement being delivered on the job is above the requirements of the city engineer's office.

The concrete is all mixed in a Hartwick mixer. In this extraordinary warm weather the concrete cast in molds in the morning has sufficiently set so that the molds can be removed by the evening. Mr. Donahue, who is in charge of the gang making the 60" pipe, informed the ROCK PRODUCTS representative that they cast twenty-five pipe every day. Smaller sized pipe are being laid for the lateral sewers, which do not require the same diameter. These require a variety of sizes, ranging from the 60" down to 24", though the three-foot length is always maintained. After the pipe has been cast and allowed to cure for a few days, it is ready for the sewer. It is turned on its side, and a few men can roll it to the place required. Here it is rolled onto a temporary platform which holds the pipe until connected with a block and tackle. The derrick to which the hoist is fastened consists of a tripod that lowers the pipe into place. After the pipe has been set into the ground, the shoulder sets in the section already laid, and the steel band is run around and locked in the loop made by the vertical bar embedded in the pipe wall. In this joint is inserted a gasket of tar paper and then filled up both outside and inside with concrete, thus forming a continuous pipe without a crack.

VIEW OF THE WAUKEGAN, ILL., SEWER AND F. BAIRSTOW, WHO SUPPLIES THE MATERIALS.

It appears to ROCK PRODUCTS that reinforced concrete pipe under certain conditions offers every needed requisite for sewer work.

In the first place, the pipe can be carefully examined, so that before being lowered into the ground and set in place, any defects of the material can be noted. The materials or aggregate can be carefully examined to see that they are up to the standard requirements, and the engineer can pass on the construction before the pipe are laid in the trench. The advantages of using manufactured pipe to the contractor are that he is able to obtain the sections already made. He does not have to bother with the mixing of the materials, neither has he to provide for the building of the forms nor the laying of the concrete. He can be sure that the pipe is sound and in good shape before it is delivered to him. The material has already set, so that there is no delay in the work of construction. As soon as the pipe is in, like the iron pipe it can be immediately covered up, so that the streets do not have to be blockaded while the contractor waits for the concrete to harden. The saving of labor is very great when it is to be taken into consideration that it requires but a few men to handle the pipe. Three men operate the derrick and lower the pipe into the ground. These same men set the pipe in place, and it requires the services of only one man to fill the joint with concrete and finish the

cementing together of the sections. The rapidity with which this work can be accomplished depends on the gang digging the trench in the line of construction.

The opinions of the various officials in charge of the work at Waukegan are that they have secured the best type of construction for their purpose, and each one engaged in his part of the work is well pleased with the results that they are obtaining.

FACTORY MADE PIPE.

Reinforced Sewer Sections of Large Size Overcome Engineering Difficulties of Long Standing

The construction of sewers is the most important feature of municipal engineering. The amount of such work that is done is measured only by the limit of the public purse to pay for the same. Sewer construction has always been regarded as one of the most expensive uses of public money and such work has to be badly needed to even be considered or undertaken. The engineering difficulties are hard to calculate in advance, for the reason that all types of underground work are more or less of an enigma until completed. It is very seldom that surface indications are anything like a good and dependable guide to what is uncovered during the process of excavation. Frequently a "hogback" of rock is found quite unexpectedly. Quicksands are often encountered, and, what is perhaps worse than either of these, courses of underground waters are always tapped to a greater extent than the preliminary calculations. All of these things have a direct bearing upon the expense of sewer construction, and many is the contractor who has taken on this class of work after the most careful drilling and other examination, only to find as his work proceeds that his cost account is running away with the contract price. The number of such contractors who have lost heavily in the construction of sewer work is legion.

There are very few cases and the circumstances are rare where the molding of large-sized sewer work in the trench is not more expensive than if such work were done by the use of factory-made pipe, custom-built to the gauge required in the sewer. Factory-made pipe has the advantage of all the economies of factory practice over the makeshift plant and organization, which must necessarily be the expensive part of the work, where great masses of concrete are molded in place in the trench.

To meet this emergency a reinforced concrete pipe has been developed and is now being built and marketed by the Reinforced Concrete Pipe Company, of Jackson, Mich. A couple of illustrations accompanying this article show the new section of sewer pipe which they are now making. After an exhaustive series of tests made by this concern on various sewer sections, using pipes reinforced with both round and square bars and various designs of woven wire fabric, they have permanently adopted the well-known triangle mesh which is made by the American Steel and Wire Company.

TEST OF SEWER PIPE REINFORCED WITH TRIANGLE MESH WIRE FABRIC.

A short time ago a most satisfactory examination was made by the city of St. Louis of a sewer section having an 8-foot inside diameter with a wall 5⅛ inches thick, in which two layers of triangle mesh reinforcement was used, the section being 4 feet in length. A concentrated load was imposed on this section, on the crown, of over thirty-three tons, with only ½-inch deflection. It was impossible to load the section further on account of the platform, which rested on the crowd, not being sufficiently large to permit more load being put on. One of the accompanying illustrations shows this sewer section with the load of thirty-three tons.

Upon the thirty-fourth ton being added some of the coils of wire slipped from their positions and skidded off. Additional tests on various sized sections reinforced with triangle mesh fabric have been made by the city of St. Louis with equally satisfactory results. The Reinforced Concrete Pipe Company have secured a number of contracts within the last few months for installation of sewers reinforced with triangle mesh fabric, among which are Grand Rapids, Mich.; Waukegan, Ill.; Angola, Ind.; Muncie, Ind.; St. Paul, Minn.; Dorranceton, Pa.; South Bend, Ind., and a number of others of equal importance.

Due to the distinctive design or arrangement of both the tension and cross members of this triangle mesh reinforcement, it is especially desirable in sewer construction, and due to this arrangement all the stresses imposed on the sewer sections are amply provided for, and when the sewer system is installed using this construction the municipalities can feel pretty sure that the sewer will hold water.

The locking joint employed by the Reinforced Concrete Pipe Company has the advantage, when properly placed in position and grouted, of making a continuous pipe which is water-tight from without and is also very simple to lay in places where underground water can with difficulty be kept from filling the trench. The same advantage applies when quicksand is encountered. Taken as a whole, the factory-made pipe of large sewer section offers economies to the sewer contractor which will at least secure him from loss at the two most liable points of difficulty to make his figures more dependable. The pronounced improvement is herein recorded.

METHOD OF REINFORCING CONCRETE SEWER PIPE WITH TRIANGLE MESH WIRE FABRIC.

Large Storage Reservoir.

WATERTOWN, N. Y., July 10.—Supt. John W. Phippen, of the waterworks system, is directing the work of constructing a 3,000,000-gallon concrete storage reservoir near the old reservoir in City Park. The improvements are to cost $26,000. A concrete sidewalk and macadam road will be built around the reservoir. The present reservoir is to be lined with concrete and a sidewalk and roadway will be built around it. At the present time 115 feet of the 650 feet of concrete wall has been laid.

THE PERFECT BAKERY.

Splendid Establishment at Louisville Is a Unique Achievement in Concrete.

The plant of the Whiteside Bakery Company at Louisville, Ky., is unique in many particulars as being the most perfectly designed, constructed and operated establishment of the kind in existence. It is a fine example of the application of the best principles of modern concrete construction. It was completed just about one year ago, having produced the first run of product on July 16, 1908, on the fiftieth anniversary of the birth of I. F. Whiteside, the founder of the company, whose announced ambition was to build the best obtainable bakery plant without regard to cost in any of its structural details, equipment and appointments, as he owed his fortune to the success of his bakery business. Mr. Whiteside died a few weeks ago, leaving behind him this magnificent plant as a monument to his memory. In early manhood he was a member of the world famous Mary Anderson company of players.

Arthur Loomis, architect, of Louisville, designed and superintended the entire construction of this plant. He is responsible for the beautiful lines suggesting the Moorish style of architecture, and his careful studies developed the general plan of the buildings, as well as each of the essential details, many of which exhibit valuable originality. Its principal features are that it is absolutely fire-proof, that its arrangement is perfect and that it is constructed with such regard to the admission of light and extreme sanitation that absolutely no flaw can be found with it in those regards. The building was erected in nine months at a cost of $90,000. The construction was not done by a general contractor, but by detail work.

The contractors who contributed the various details were as follows: Cut stone work, Peter & Burghard Stone Company; cement, furnished by J. B. Speed & Company; Iron and steel for reinforced concrete furnished by Dehler Bros.; concrete construction, Lee Figg & Company; painting, C. F. Bierbaum; electrical and machinery work, Joseph McWilliams & Company; millwork, Southern Planing Mill Company; electric clock, Herman Korphage; structural iron work, Snead Architectural Iron Works; ornamental iron work, Richard Henzmann.

All the contractors were local men, as Mr. Whiteside's idea was to have a "made in Louisville" plant.

The bakery has a frontage of 158 feet on Broadway and extends back 250 feet. The main portion, fronting on Broadway, is two stories high, with a basement, and is 55 feet deep. The remaining or factory portion is one story high, having a concrete roof, penthouse skylights and ventilators, which give light to the interior portions. The structure is fireproof throughout, and is built of reinforced concrete all the way through except the outside walls, which are of common brick. These are plastered with cement mortar, embedded in which is used broken vitreous tile of various colors as a decorative treatment. Mr. Loomis said that this utilization of the waste tile from the floors is an effective way of disposing of it, as it gives the exterior walls a very pleasing appearance. At the corner of the building is a great electric clock, which has attracted general attention. It is illuminated at night with lights which form the words "Mother's Bread."

One of the chief advantages of the location and arrangement of the bakery is that time and labor are saved in the handling of materials and the product of the bakery. The plant is located beside the Pennsylvania Railroad tracks, and the arrangement is such that materials go direct from the cars to the consumer.

The flour in barrels is taken from the cars, placed directly into large iron chutes leading to different parts of the basement storage room. The sifting and cleaning are done mechanically in the basement. A "worm" elevator runs the flour to the second floor, where great mixing machines mix the dough, going from the sifters and blenders on to the dough mixers, and into the sanitary dough troughs. These are portable and can be wheeled with their contents into the cooling room.

WHITESIDE BAKERY, LOUISVILLE, KY., A MODEL PLANT.

From this room the dough descends, through iron chutes, into dough dividers, thence into the "merry-go-round." The next step in the preliminary process takes place in the moulding machines, where the dough is formed into loaves for the baking pan. These loaves are placed on large portable cars and wheeled into the steam rooms, where they remain about a half hour to raise. This is quite different from the home method, where the bread has to be "set" over night for the "raising" process.

Now that it is time to begin baking, the loaves are wheeled to the ovens. The oven room in the Whiteside Bakery would be a joy to any baker, and is perhaps the finest one extant. It is long and well lighted, with nine ovens down each side. These have a combined capacity of one hundred and forty thousand loaves daily. The ovens, which are faced with white enameled tile, are fired from the rear with coke, which is brought in by an overhead trolley.

After a proper time the bread is wheeled out of the opposite side of the steam box, which opens into one hundred and twenty corridors between two rows of ovens.

During the whole time of the baking, pilot lights show the condition of the bread. When it is finished it is delivered to the shipping room. Twenty doors leading to as many wagons lead from this room. These wagons are lined up in a covered paved court. Delivery of the bread begins at 12:30 in the morning, and the last wagon leaves the court at 1:45 a. m., to serve the community with breakfast rolls and bread.

Just above the front of the ovens is a wall; slightly protruding over and between it and the oven tops is a space which permits the heat to pass out, to prevent overheating the workers, as is often the case in bakeries. Much care had to be taken in the arrangement of the skylights, etc., in order to produce the proper amount of light—just enough to enable seeing into the dark ovens and yet enough in which to work comfortably and to show every spot of dirt that might accumulate; but the proper results were obtained by the minute arrangement of upright skylights over the middle of the corridors from end to end.

Bath rooms of the most approved design occupy one part of the building. Every employee is compelled to bathe before commencing work, and is furnished by the company a freshly laundered linen suit each day before beginning work, and all workers are required to wash their hands when returning from any place about the building where there might be a chance to collect the least particle of dirt.

The mechanical appliances throughout the plant are the very latest design. But little of the work is done by hand, the machinery even dividing and weighing each loaf automatically, and the least possible waste of energy is avoided in the plant, and to fully appreciate the genius of the architect one must go through the plant and observe how perfectly the various departments coincide, making one splendid system.

The entire building is lighted with electric lights, each light being enclosed in a glass globe for sanitary purposes, the fixtures being absolutely dust-proof. The flour-sifters and blenders, as well as the machines in the moulding-room, are driven by motors attached to the ceiling. A tiny motor is also used in the testing laboratory, the Whiteside bakery being a model both among bakeries and as to electrical installations.

A sketch accompanying this article gives an idea of the way the bakery is arranged. In front are the general offices and the factory where the bread is mixed and handled before going into the ovens. Immediately behind are two rows of ovens, which are made of firebrick with a coating of enamel of the Peterson style. There are nine ovens in each row, with passages behind them for feeding. The arrangement of the light is such that they can be looked after without discomfort, while the ventilation carries off the heated air, maintaining an even temperature and making the work room comfortable.

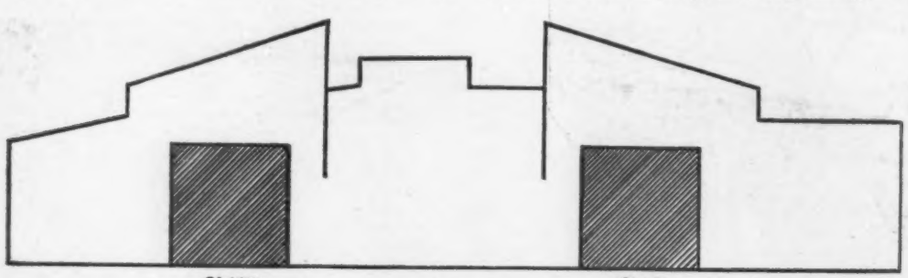
On one side of the ovens are the power and machinery room and the storage places for fuel, coal and coke being used. On the other side is the bread delivery room, which opens out on the wagon shed, where the wagons line up to be loaded. This shed is paved with vitrified brick, and is supported by iron trusses. It also is fireproof.

Behind the oven room is a dining-room, lavoratories and bath and a locker room, all of which are used by the employees and assist in their comfort and cleanliness. In fact, that is the prevailing idea throughout, to have the plant as clean and as sanitary as it is possible to be.

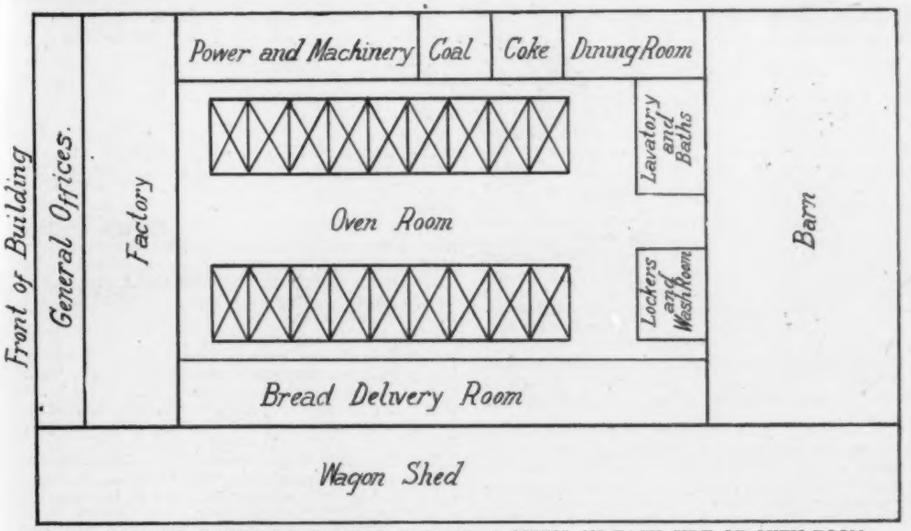
The concrete used in the building was mixed according to the usual one-two-four proportions. In making the concrete for the floors of the bakery portion of the building, granite siftings were used in place of sand, in order to give a smoother surface in the bake-oven rooms. This made the floors one solid mass like granite. In all the floors the base and wainscoting is of marble, and this is used in the lavoratories and all the work rooms. Cleanliness was the idea which prompted its general use.

The Ransome mixer was used in making the concrete for the building, and the Ransome twisted bar was used in all the reinforcing. The curtain walls forming ventilating hoods over the face of the ovens are suspended from truss beams above. The floors, walls, ceilings and foundations are of reinforced concrete.

In discussing the building and its construction, Mr. Loomis said: "The possibilities of reinforced con-



PROFILE OF WHITESIDE BAKERY, SHOWING LIGHTING AND VENTILATING ARRANGEMENT.



GROUND PLAN OF WHITESIDE BAKERY, SHOWING 9 OVENS ON EACH SIDE OF OVEN ROOM.

crete construction are almost beyond computation. It is the coming type of construction, and the uses to which it may be wisely put have by no means been exhausted. There has been advancement in no part of the building field such as has taken place in concrete, and there is a still greater future before it. Reinforced concrete is especially adapted to such types of buildings as the Whiteside Bakery, because where sanitation, cleanliness or quarters suitable for storage are involved, it is ideal."

Mr. Loomis was the architect for the Fireproof Storage Company's $100,000 building on Green street below Third. It is fireproof throughout. The National Concrete Construction Company were the contractors, and it is one of the handsomest buildings in the city. He has been a practicing architect for more than twenty years, and ranks high in Louisville, his work in connection with buildings constructed of reinforced concrete having been particularly noteworthy. His confidence in that type of construction and his belief in its possibilities have made him an unusually good man to handle buildings of the kind, and that is one of the reasons why he is appealed to in most cases where concrete is to be used.

Will Install Two Concrete Plants.

LEXINGTON, KY., July 9.—The Continental Artificial Stone and Manufacturing Company, with headquarters in this city, has contracted to install two more new plants for the manufacture of material. One of these will be in Toronto, Canada, and the other in the Isle of Pines, Cuba. A. K. Haynes, secretary of the company, returned recently from Buffalo, N. Y., bringing with him the above information. Mr. Haynes, as the representative of the company, has just finished installing a $6,000 plant in Buffalo, which has been tested and is now ready for operation.

Concrete Brick Plant Completed.

The Oklahoma Cement Brick & Product Company of Oklahoma City, Okla., who have just completed their new plant for the manufacture of cement brick, are turning out 25,000 high grade waterproof brick per day and have their entire output sold up for over four months in advance. The brick have met with the heartiest approval of architects and builders, which is shown by the amount of orders already secured.

One order for over one half million common and faced brick was sold to the contractors who are building the new eight-story Harbour Bass building, which it is conceded will be one of the finest buildings in Oklahoma City, if not the entire southwest.

The brick are made with the new McIntosh Sand Cement Brick Machine, which has a capacity of 25,000 to 30,000 brick per day.

W. K. Hamilton and E. L. Benedict of Oklahoma City are southwestern agents for the McIntosh sand cement brick machines.

Will Establish Concrete Factory.

BROCKTON, MASS., July 1.—A company has been organized here to operate a concrete block factory. The men composing the firm are J. E. Ward, M. L. Harvey and C. G. Clapp.

The Bray & Lukers Company of Buffalo, N. Y., has been incorporated by W. F. Bray, J. Parry Lukens and Wallace Thayer. The firm will manufacture sewer pipe, flue linings, wall coping and hard builders' supplies.

The Huntington Cement Block Company of Huntington, W. Va., has been incorporated for $10,000. The incorporators are L. J. Ashworth, R. L. Archer, F. S. Brown, and J. L. Stewart.

The Excelsior Concrete Company of Brooklyn, N. Y., has been incorporated to manufacture building materials. The incorporators are John Campbell, C. S. Sherwood and W. A. Thorn.

The New Haven Artificial Stone Company of New Haven, Conn., has been incorporated to manufacture concrete blocks. Incorporators are H. E. Warner, Jr., V. H. Anderson and Carl A. Mears.

The Zagelmeyer Cast Stone and Block Co.

BAY CITY, MICH., July 10.—The plant of the Zagelmeyer Cast Stone & Block Company, which manufactures the Zagelmeyer concrete block, is running full tilt. The machinery end of this company has furnished equipment for three plants recently, one at Grand Rapids, Mich., one at Indianapolis, Ind., and the other in Oregon.

The Attalia Pressed Stone Company.

ATTALIA, WASH., July 17.—The plant of the Attalia Pressed Stone Company has been completed and the first blocks were turned out today. The Pettyjohn system of collapsible forms is employed and the plant has a capacity of 200 blocks a day. This will be increased. The firm is composed of J. R. Thompson, H. M. Kelleher and A. R. Thompson. One of the first contracts will be the erection of a concrete stone reservoir on the hill east of town, with a capacity of 12,000 gallons. Water will be pumped from wells, furnishing a water supply for the entire town.

White Concrete Work Popular in Oskaloosa.

OSKALOOSA, IA., July 8.—The Carlon Construction Company are important factors in the concrete business, both locally and throughout this territory. George Carlon, the head of the company, is well known among cement users, as he is the president of the Iowa Cement Users' Association. Engaged in this business with him are his two sons, one of whom is here and the other in charge of the business at Fort Smith, Ark., where they do a large business.

The company has done considerable concrete work in the form of combination curb and gutter as well as sidewalks. Their factory is well equipped with machinery and they make concrete blocks.

The concrete work in the Jefferson public school to be erected in this city has been awarded to this company. It is to be a novel structure, in many respects. The design is original with the architect, S. B. Sinclair.

It is to be a one-story building, consisting of nine rooms, office and storerooms. It is 157'x69'. The floors will all be concrete and the roof will also be of concrete. The exterior will be of pressed brick and the trimmings, such as lintels, sills, water tables, steps, etc., are to be of concrete made of white Portland cement for the facing. In all the concrete work will amount to about $15,000, while the total cost of the building is to be $40,000.

John MacKay is the general contractor for the building.

A building has been completed recently by this company for the Oskaloosa Vehicle and Implement Company which completely demonstrates the advantages of using concrete blocks for a garage.

The building was designed and constructed by this company and the owners are more than pleased with it. The garage is 60'x120' and is on a prominent corner, so shows off to splendid advantage. The blocks were made on a Foote face-down machine. The courses were alternated, plain and rock faced. In the concrete aggregate Medusa brand of Portland cement, manufactured by the Sandusky Portland Cement Company of Sandusky, Ohio. The blocks were faced with Medusa white cement so that it has a perfectly white appearance.

The floor is of concrete and the roof trussed with timbers.

The structure has been the source of much favorable comment and the owner is now making preparations to enlarge it.

Test Concrete Blocks.

GRAND RAPIDS, MICH., July 1.—The Standard Artificial Stone Company, which is manufacturing a one-piece hollow concrete block, had a mechanical test made of the strength of the blocks recently, with the Grand Rapids & Indiana roundhouse testing machine, which is used by the company. The block crushed under a pressure of nineteen tons. The report made officially is as follows:

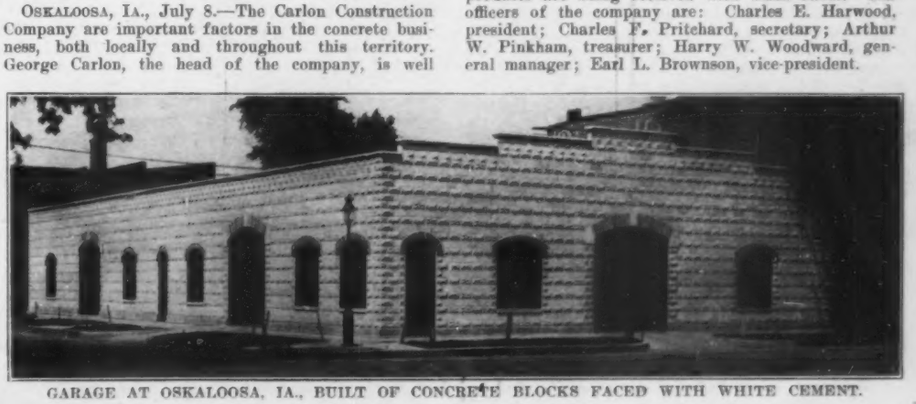
"The block was made May 26, 1909, and had an ultimate strength of 38,000 pounds, and was only 20 days old. No part of the facing scaled off separately. In fact the facing, which by the Borst system is an integral part of the block itself, adheres to the part of the crushed blocks. This shows by the test made that this block would stand the pressure equal to a building 40 stories high, each story 12 feet."

Will Build Concrete Elevator.

MINNEAPOLIS, MINN., July 8.—A concrete warehouse and addition to the elevator will be erected at Fifteenth and Rollins Avenues, S. E., by W. W. Savage. The new building will be 70'x200', one story high. The addition to the old building will be 60'x90', and have a capacity of storing 350,000 bushels of grain. The contract for the general construction has been awarded to Haglin & Starr.

The Structural Cement Stone Company.

LYNN, MASS., July 19.—The Structural Cement Stone Company is a new enterprise here, and its products are being received with much favor. The officers of the company are: Charles E. Harwood, president; Charles F. Pritchard, secretary; Arthur W. Pinkham, treasurer; Harry W. Woodward, general manager; Earl L. Brownson, vice-president.



GARAGE AT OSKALOOSA, IA., BUILT OF CONCRETE BLOCKS FACED WITH WHITE CEMENT.

Enterprising Western Municipality.

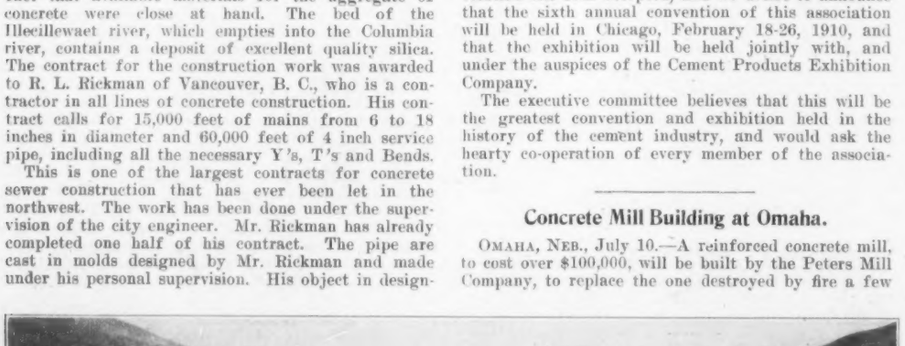
The city of Revelstoke, B. C., is a thriving municipality. It is situated on the east shore of the Columbia river on the Canadian Pacific Railway. The enterprise of its people has been equal to that of any city on the Pacific coast. Already an excellent water system has been installed, an electric light plant and telephone system have likewise been put in recently.

The city council decided to construct a sewerage system and the city engineer was instructed to investigate the best and most economical system that could be installed. The investigation made by the city engineer convinced him that concrete sewer pipe would be the best to lay, as good if not better than clay sewer pipe.

One thing in favor of the concrete pipe was the fact that available materials for the aggregate of concrete were close at hand. The bed of the Illecillewaet river, which empties into the Columbia river, contains a deposit of excellent quality silica. The contract for the construction work was awarded to R. L. Rickman of Vancouver, B. C., who is a contractor in all lines of concrete construction. His contract calls for 15,000 feet of mains from 6 to 18 inches in diameter and 60,000 feet of 4 inch service pipe, including all the necessary Y's, T's and Bends.

This is one of the largest contracts for concrete sewer construction that has ever been let in the northwest. The work has been done under the supervision of the city engineer. Mr. Rickman has already completed one half of his contract. The pipe are cast in molds designed by Mr. Rickman and made under his personal supervision. His object in designing his own molds was to provide for a more substantial joint between the bell and the body of the pipe by forming a large O. G. at this point.

This not only strengthens the pipe, at what is the weakest part, but also gives the operator more freedom in tamping the material into the bell. The cost of the additional amount of material used in the pipe more than offsets the time saved in tamping. The success of the concrete pipe sewers at this place has led other municipalities in the West to investigate the work that is going on at Revelstoke and no doubt other cities will follow the example set by this town and construct sewers of like material.



CONCRETE PIPE ON THE YARD FOR THE REVELSTOKE, B. C., SEWER.

Cement Show Dates Changed.

The dates for the third annual Cement Show in the Coliseum, Chicago, previously announced as February 17-23, 1910, have been changed to February 18-26, 1910. The show will open on the evening of February 18 and be open continuously until the evening of Saturday, February 26, being closed, however, on Sunday the 20th. Under the new dates the show will be open two days longer than the show held last February. Detailed arrangements for the show have not yet been completed. The committee in charge hopes to distribute diagrams, application blanks, rules and regulations, etc., among prospective exhibitors within three or four weeks.

The American Society of Engineering Contractors, an organization recently formed, of which George W. Jackson of Chicago is the president, will also meet during the show. The Illinois Society of Municipal Contractors have signified their intention of holding the annual meeting at that time also.

Will Build Concrete Dock.

The International Harvester Company of Chicago will build at the Deering plant of the company a reinforced concrete dock on the north branch of the Chicago river. W. D. Price is the engineer in charge.

Sixth Annual Convention and Exhibition.

The Executive Committee of the National Association of Cement Users has had under active consideration for the past five months the place for the next convention and exhibition of this association and has investigated with great care the possibility of holding the show in Madison Square Garden, New York City. The unsettled condition of the cement industry is such that after a thorough investigation it did not seem expedient or advisable to hold the next convention in Madison Square Garden. This is an undertaking of very considerable moment and would necessitate a large guarantee fund.

An invitation has been extended by the Cement Products Exhibition Company to hold a joint cement show at Chicago in connection and coincident with the annual convention. After due consideration this invitation has been accepted, and we desire to announce that the sixth annual convention of this association will be held in Chicago, February 18-26, 1910, and that the exhibition will be held jointly with, and under the auspices of the Cement Products Exhibition Company.

The executive committee believes that this will be the greatest convention and exhibition held in the history of the cement industry, and would ask the hearty co-operation of every member of the association.

Concrete Mill Building at Omaha.

OMAHA, NEB., July 10.—A reinforced concrete mill, to cost over $100,000, will be built by the Peters Mill Company, to replace the one destroyed by fire a few weeks ago. The contract has been let to the Leonard Construction Company, and it is the expectation to have the new mill under roof within six weeks, and to begin grinding on September 1.

Has New System for Driving Piping.

PORTLAND, ORE., July 16.—Thomas Bilyeu, M. E., has secured the patent papers in this and other countries for a system of driving and manufacturing concrete piles and concrete footings for large buildings.

The system perfected by Mr. Bilyeu has a strong metal core, which fits into a hinged adjustable tube, the latter carrying a fixed steel point. This tube is driven into the ground by means of a steam hammer operating at great speed. When a proper depth has been attained, a strong lever pressure releases the core, so that it may be withdrawn. Then the earth pressure causes the slightly collapsible tube to contract, freeing from the tight grip that impedes withdrawal in the other system.

The patent rights have been turned over to the Portland Concrete Pile and Equipment Company, the officers of which are: W. A. Grundahl, M. E., C. E., president; Thomas Bilyeu, M. E., engineer and manager; C. F. Marshall, C. E., secretary; J. M. Cook, treasurer; R. W. Wilbur, attorney.

Washington Company Formed.

SPOKANE, WASH., July 8.—H. G. Kirkpatrick advises us that the Washington Concrete Construction Company has been organized. It will have its headquarters here and it is in the market for all materials necessary for that line of business.

To Establish Concrete Tile Factory.

EATON, O., July 8.—A concrete tile factory will be established here by F. B. Husted and H. M. Young. The plant will be located near the Lovett gravel pit.

New Incorporations.

The Western Sand and Gravel Company, Farmington, Ill., has increased capital stock from $2,000 to $25,000, and the number of directors from three to five, and location of principal office from Farmington to Spring Valley.

The Palmer Sand Company, Eddyville, Ia., has been incorporated with a capital stock of $10,000 by C. C. Palmer, Carl C. Powell and F. A. Palmer.

W. M. Longley Quarry Company, 713 Bloomingdale road, Baltimore, Md., has been incorporated with a capital stock of $10,000 to produce crushed rock. Daily capacity, 300 tons. William M. Longley, president; Joshua T. Gallagher, vice-president, and William P. Bolton, secretary.

The Palo Pinto Crushed Stone & Lime Company has just been incorporated in Mineral Wells, Tex., with a capital stock of $5,000, by E. B. Ritchie, president; C. E. Read, vice-president; W. I. Smith, secretary-treasurer, and A. A. Goodwin, general manager.

The Hendricks Quarry Company has been incorporated in Philadelphia, Pa., with a capital stock of $25,000. The incorporators are John S. Roberts, W. Penn Corson, Robert G. Fleming, all of Camden, N. J.

The Blake Crusher and Pulverizer Company has been incorporated at Pittsburg, Pa., with a capital stock of $10,000.

The Columbia Quarry Company of St. Louis recently filed a statement increasing its capital stock from $42,000 to $54,000.

West Virginia and Pittsburg Sand Company, of Berkeley Springs, W. Va., has been chartered to conduct a crushed stone business in Bath district, Morgan county. The authorized capital stock is $125,000. The incorporators are Frank S. Ehlen, Frank Ehlen and James F. Rawlings, of Baltimore; John F. Sprague, of Raleigh, N. C., and Rowland C. Ringgold, of Shepherdstown.

LOWVILLE, N. Y., July 17.—A certificate of incorporation of the Watertown White Brick Company, of Watertown, has been filed. The capital stock is $10,500, and the directors are: Llewellyn M. Aldrich and Francis H. Root, of Watertown, and Burton W. Aldrich, of Theresa, N. Y.

SALT LAKE, UTAH, July 11.—The Crown Brick Company, of Salt Lake, filed its articles of incorporation recently. Its capitalization amounts to $100,000. A. M. Wrench, H. S. Stowe, M. J. True, W. S. Elton and E. C. Wackner are named as trustees until the regular election of officers. The company will engage in a general brick business.

The Madisonville Drain Tile Company, Madisonville, Ky., has been incorporated with a capital of $1,000. The incorporators are L. W. Schmetzer, of Madisonville; J. D. Bobbitt, of Nebo, and Ida W. Bobbitt, of Nebo.

Henry C. Grieme Company has been incorporated at Amsterdam, N. Y.; manufacturing bricks, stone and building material; capital, $135,000. Incorporators: Mary Grieme, Martha M. Niles and Amelia C. LeHahn, Amsterdam, N. Y., and others.

The Tualatin Brick & Tile Company, with principal place of business at Portland, Wash., capital stock $50,000, has been incorporated by E. W. Ring, G. F. Wittner and E. E. Covert.

The States Plastering Company, Chicago, has increased its capital stock from $1,000 to $5,000.

CAIRO, ILL., July 13.—The Cairo Sand & Gravel Company is the name of a new company which is to take over the property and plant of the Cairo Contracting & Dredging Company.

The Acme Column Company of Jersey City, N. J., has been incorporated for $50,000 to do concrete work. The incorporators are J. J. Tresidder, Ernest Naumann and George D. Benham.

The General Concrete Construction Company of Cleveland, Ohio, has been incorporated for $10,000. The incorporators are M. F. Raines, Fred A. Johnson, William R. Davis, J. E. Lavin, and E. Wit-

The Deckman-Duty Brick Company is making extensive improvements at its plant in Collinwood, Ohio. The engine and boiler rooms are being rebuilt. The improvements will cost about $30,000.

AMERICAN SOCIETY FOR TESTING MATERIALS.

Twelfth Annual Meeting Crowded With Important Technical Developments, With the Largest Attendance of Record.

The twelfth annual meeting of the American Society for Testing Materials was held at the Hotel Traymore, Atlantic City, N. J., June 29 to July 3. It was from many standpoints a very interesting and important gathering of technical talent having to do with the materials of construction. Interesting from the fact that the personnel of the attendance fully represented all types of materials and their uses, and important because the society stands as the only independent forum in this country for the examination, study and discussion of materials in the broadest and fullest sense. The largest attendance in the history of the organization was recorded—nearly 300 members and visitors being present.

The standard specifications adopted by this society are better respected and carry more weight than any other standards, for the reason that all of them so far promulgated have been developed by the cooperation of the best efforts and attention of the ablest engineering talent to be found in this or any other country. In fact, all the standards erected to date have been adopted by the unanimous consent of all the worthy and properly qualified experts and specialists whose research and study have brought them into the circle of interest involved in each particular specification.

It is a very busy society, because its work will not be complete until the whole range of structural materials is standardized and classified. The vast amount of work already done looks like a mere beginning compared to the mountain of work yet to be taken up. But the first indispensable members of the modern buildings have been well covered, and with the growing interest evinced by the membership the present very gratifying progress will doubtless be materially quickened. Naturally the sinews of war, financial support, are needed in more plentiful supply to carry on a wider range of work.

The ultimate practical economy and usefulness of the work of the American Society for Testing Materials can hardly be overestimated. For instance, the impossibility of getting anything better than a compromise in the matter of competing building materials into a municipal building code prepared by the route of the usual totally unqualified commission on board is clearly improper, dangerous and radically wrong from every standpoint. Here is no place for compromise, but the independent and skillful judgment of the best informed aggregation of engineers of the country is needed. Such are the standards of this society, uniform in every locality, and equally applicable to the goods of every manufacturer, fair, open and fully explained for the unmistakable guidance of all concerned. When the list of standard specifications is more complete the labored and voluminous building ordinance will be a thing of the past, and a clearer understanding of the qualities of materials—better and safer buildings will result.

The total membership of the society, according to the report of the Executive Committee, is 1,118, comprising the most eminent engineers of the United States, headed by President Charles B. Dudley, of Altoona, Pa.; vice-president, Robert W. Lesley, of Philadelphia; and Professor Edgar Marburg, of Pennsylvania University, the secretary and treasurer.

The executive sessions of the meeting were promptly dispatched in due form. W. R. Webster, consulting engineer, Philadelphia, Pa., and W. A. Bostwick, Carnegie Steel Company, Pittsburg, Pa., were elected to the Executive Committee, which is the governing board of the society.

The social side was provided for amidst the voluminous technical proceedings by three very pleasant numbers of the program. A recreation period Wednesday afternoon, which was employed by many of the members for inspecting the paint exhibit just south of the board walk, and others went into the water or enjoyed the sea breezes from the promenade chairs. The annual dinner Thursday evening, where good things to eat and engineering repartee were mixed up delightfully. An engineering smoker on Friday evening, with good cigars and an attractive accompaniment known as "fish-house punch," from the recipé of R. E. Griffith. Whatever that is, it's a man's size, and amazingly good on a warm evening. Everybody enjoyed these restful numbers to the fullest extent.

President Dudley's annual address, delivered on Tuesday evening, sounded the keynote and really opened the technical proceedings. His subject was, "Engineering Responsibility." In it he comprehensively reviewed the subject of the production and manipulation of materials as they have been, as they should be, and as the power and influence of this society bears upon them. The address was delivered before a large and distinguished audience, who fully appreciated the able discourse. Mr. Dudley is chief chemist of the Pennsylvania Railroad, and later on in the proceedings was chosen as one of the delegates to represent the American Society for Testing Materials at the coming congress of the International Association for Testing Materials to be held in Copenhagen in September.

CEMENT AND CONCRETE.

Vice-President Robert W. Lesley presided over the meeting devoted to cement and concrete, which was held Thursday afternoon. It was a really enjoyable session, partly owing to the witty good humor and always apt leadership of the chairman. In fact, no member left the room during the entire session.

ROBERT W. LESLEY, PHILADELPHIA,
Leader of the "Cementers' Division" of the American Society for Testing Materials.

Change In Cement Specification.

Prof. George F. Swain, Massachusetts Institute of Technology, presented the report of Committee C on Specifications for Cement. Two small changes in the standard specifications were recommended as follows:

1. To amend the requirements for specific gravity of Portland cement to read as follows: "The specific gravity of cement shall not be less than 3.10. Should the test of cement as received fall below these requirements a second test may be made upon a second sample ignited at a low red heat. The loss in weight of the ignited cement shall not exceed 4 per cent."

2. To amend the requirements for tensile strength for both natural and Portland cements as follows:

NATURAL CEMENT.—The minimum requirements for tensile strength for briquettes one square inch in cross section shall be as follows, and shall show no retrogression in strength within the periods specified:

NEAT CEMENT. Age.	Strength, Lbs.
24 hours—in moist air	75
7 days—1 day in moist air, 6 days in water	150
28 days—1 day in moist air, 27 days in water	250
1 PART CEMENT, 3 PARTS STANDARD OTTAWA SAND.	
Age.	Strength, Lbs.
7 days—1 day in moist air, 6 days in water	50
28 days—1 day in moist air, 27 days in water	125

PORTLAND CEMENT.—The minimum requirements for tensile strength for briquettes one square inch in section shall be as follows, and the cement shall show no retrogression in strength within the periods specified:

NEAT CEMENT. Age.	Strength, Lbs.
24 hours—in moist air	175
7 days—1 day in moist air, 6 days in water	500
28 days—1 day in moist air, 27 days in water	600
1 PART CEMENT, 3 PARTS STANDARD OTTAWA SAND.	
Age.	Strength, Lbs.
7 days—1 day in moist air, 6 days in water	200
28 days—1 day in moist air, 27 days in water	275

Standard Sand For Testing.

Richard L. Humphrey, secretary of Committee C, exhibited a sample of bag which has been adopted by the American Society of Civil Engineers to be used for all shipments of standard sand for laboratory use. He explained that arrangements had been effected whereby standard Ottawa sand would be provided at distributing stations in various parts of the country, and called attention to the importance of all laboratories using the same sand, so that the results of tests would be comparable one with another. Further, the arrangements made in reference to standard sand were such that the price would be low enough to make it available in every laboratory.

Concrete and Reinforced Concrete.

Prof. F. E. Turneaure presented the report of this committee which was signed by himself as chairman and Richard L. Humphrey as secretary, as follows:

To the members of the American Society for Testing Materials: The Committee on Reinforced Concrete desires to present herewith the report of the Joint Committee on Concrete and Reinforced Concrete as adopted by letter ballot of the Committee on December 20, 1908. As this report states, the committee is not able to present a final report at this time and submits this progress report for the information of members of the several societies represented on the Joint Committee. It is expected that the Joint Committee will present a final report when sufficient data to serve as a basis for final conclusions has been obtained, and in the meanwhile this report is submitted as the expression of a majority of the members of the Joint Committee.

The full report appears on pages 54-57.

Fireproof Floor and Partition Testing;

Prof. Ira H. Woolson, Columbia University, presented the report of Committee P as follows:

Since no criticisms or suggestions for change have been received regarding the proposed Standard Test for Fireproof Partition Construction, presented by this committee to the society for consideration at the meeting held June 23d to 27th, 1908, your committee recommends that the following specifications presented tentatively at that time be now submitted to letter ballot of the society. (Passed to letter ballot.)

I might add that at a recent meeting of our committee it was decided that the committee would next consider the subject of a proper specification for a fire test of column protective covering, and the committee would be very pleased to receive information or suggestions on this topic from any of our membership.

Proposed Standard Test for Fireproof Partition Construction

The test structure may be located at any place convenient to the investigator, where all the necessary facilities for properly conducting the test are provided.

The test structure shall be of such design that the partition construction to be tested shall form at least one side of the structure. The other sides, roof and foundations of the structure may be of any materials and design that will withstand and confine the fire within the test structure for the required time.

At a height of not less than 2 feet 6 inches, nor more than 3 feet, above the ground level, a metal grate, properly supported, shall be provided, covering the whole inside area of the building.

In the walls below the grate level draught openings shall be provided, as many as possible, furnishing openings with an aggregate area of not less than 1 square foot for every 10 square feet of grate surface. Means for temporarily closing these openings shall be provided.

Immediately above the grate level, in one of the end walls of the structure, a firing door, 3 feet 6 inches wide by 5 feet high, must be provided.

Flues shall be supplied at each of the corners, and more often for a test structure with more than 250 square feet of grate surface, with sufficient opening to insure a proper draught. In no case shall a flue area be less than 180 square inches.

The size of the test structure will depend on the area of the partition construction to be tested. In no case shall the partition construction under test be less than 9 feet 6 inches high, nor less than 14 feet 6 inches long. This entire area must be above the level of the grate bars and, within such dimensions, must not be reinforced or braced in any manner other than is done as an inherent and essential part of the system of construction. The edges may be supported in any manner fairly representing the conditions of support in good practice.

The width of the test structure, at right angles to the partition under test, shall not be less than 9 feet.

The construction to be tested shall be subjected for two hours to the continuous heat of a fire, rising in temperature to 1,700 degrees F. by the end of the first half hour, and maintained at an average temperature of 1,700 degrees F. for the balance of the test; the fuel used being either wood, gas or oil, so introduced as to cause an even distribution of the heat throughout the test structure.

The temperature obtained shall be measured by means of standard pyrometers under the direction of an experienced person. The type of pyrometer is immaterial so long as its accuracy is secured by proper standardization. The temperature should be measured near the center of the test structure about 6 inches below the roof or ceiling and also at the center of each partition under test, about 7 feet above the grate level. In case the partition under test is more than 15 feet long, additional pyrometers shall be used, symmetrically disposed and not more than 12 feet apart. Temperature readings at each point shall be taken every three minutes, and average used as the controlling temperature.

At the end of the heat test a stream of water shall be directed against the construction under test, discharged through a 1½-inch nozzle, under 30 pounds nozzle pressure, for 2½ minutes, the nozzle being held within 2 feet of the firing door and the hose stream being played backward and forward over the entire surface of the partition under test.

The test shall not be regarded as successful unless the following conditions are met: No fire or smoke shall pass through the partition during the fire test; the partition must safely sustain the pressure of the hose stream; the partition must not warp or bulge, or disintegrate under the action of the fire or water, to such an extent as to be unsafe.

Tests of Concrete Column.

A valuable paper by M. C. Wythe, bearing this title, was read by Prof. Turneaure, comprising a number of tests made at the laboratories of Wisconsin University during the past year, on plain and reinforced concrete columns, including columns reinforced by the following different systems: Latticed angle structural steel, high carbon steel spirals, spirals together with vertical rods, vertical rods with ties one foot apart. The results were shown in diagrams which were explained by the reader of the paper, who briefly discussed the features of the tests, the following conclusions being offered:

1. A small amount, ½ to 1 per cent, of closely spaced lateral reinforcement, such as the spirals used, will greatly increase the toughness and ultimate strength of a concrete beam, but does not materially affect the yield point. More than 1 per cent of lateral reinforcement does not appear to be necessary.

2. Vertical steel in combination with such a lateral reinforcement raises the yield point and ultimate strength of the column and increases its stiffness. Columns reinforced with vertical steel only are brittle and fail suddenly when the yield point of the steel is reached, but are considerably stronger than plain columns made from the same grade of concrete.

3. Increasing the amount of cement in a spirally reinforced column increases the strength and stiffness of the column. A column made of rich concrete or mortar, and containing small percentages of longitudinal and lateral reinforcement, is without doubt fully as stiff and strong and more economical than one made from a leaner mix reinforced with considerably more steel. In these tests, doubling the amount of cement increased the yield point and ultimate strength of the columns without vertical steel, about 100 per cent and added about 50 per cent to the strength of those with 6 1/10 per cent vertical steel.

4. From the behavior of the columns reinforced with spirals and vertical steel, under test and the results computed, it would seem that a static load, equal to 35 to 40 per cent of the yield point, would be a safe working load.

5. The results obtained from tests of columns reinforced with structural steel indicate that such columns have considerable strength and toughness, and that the steel and concrete act in unison up to the yield point of the former. The shell of the concrete will remain intact until the yield point of the steel is reached but no allowance should be made for its strength and stiffness.

6. As many of the blotters on the tops and bottoms of the columns bore imprint of the vertical steel after failure, it would seem a safe precaution to use bed plate at the foundations for such columns and thus prevent any possibility of the steel punching through the concrete under an excessive load.

Practical Use to Be Made of Cement Testing.

Richard K. Meade, consulting engineer, presented a paper under the title, "Suggestions as to Practical Use to Be Made of Cement Testing," which exhibited economies that may be achieved by fine grinding in the process of manufacturing cement. He recommended the use of less cement in the concrete mixture, provided the cement is good enough. An illustration where a saving could be made in this way was cited.

Mr. Lesley remarked that experience had demonstrated that such advice to contractors was dangerous.

Mr. Humphrey stated that it was not proper to recommend less cement when the other materials making up the total of the concrete mass showed such a wide divergence in different localities and even on the same job. He suggested that it was better to let the matter of cement stand on the present high standard, and devote more study and concentration to the production of first-class concrete.

Oft Repeated Loading of Concrete Beams.

Prof. H. C. Barry, of Pennsylvania University, read an interesting paper on this subject supplementary to his former work reported at the last meeting of the society. Five more similar beams to those tested last year had been made and tested under the same conditions, and with practically the same results. One million, seven hundred fifty thousand loadings demonstrated that the ultimate strength of the beam is affected, but not the maximum deflection, the bond of the cement, the change of the neutral axis nor the ultimate deformation in the concrete was effected. The last five beams tested carried a lower percentage of reinforcement, so as to more nearly approach the ideal ratio for the stress of 16,000 pounds to the square inch of steel and 500 pounds per square inch of concrete for the load.

Tests of Bond of Steel Rods Embedded In Concrete By Three Methods.

Prof. Barry presented his second paper under this title. He first explained the customary method of making such tests by pulling or pushing an embedded bar out of concrete. This does not apply to the conditions presented by the reinforced concrete beam, because both the steel and the concrete are in compression, while in the reinforced concrete beam the concrete is in compression while the steel is in tension, and both materials are in tension when the beam is loaded. He finds that the bond between concrete and steel is really much less in the beam than in the common way of making such a test by the thrust or pull method.

His tests amounted to a comparison of results obtained by these two methods with a third consisting of testing of his own adoption. He made a number of small reinforced concrete beams and subjected them to the bending test, with arrangements for attaching an extenso-meter. When the beam is loaded the elongation of the rod is measured and the pull computed at the time the bond between the concrete and steel fails. Values so obtained range from one-third to two-thirds of those secured by the other tests. Prof. Barry concluded with the statement that the maximum value of the bond between concrete and steel in reinforced concrete beams is from 200 to 250 pounds per square inch as developed by his test. He recommended that this value should be used in future computations instead of higher figures usually quoted.

Nails Used As Aggregate and Reinforcement.

L. S. Moiseiff presented a paper entitled "Concrete Reinforced by Nails," and it soon developed that the method of using nails in concrete was really the aggregate material as well as the reinforcing material, and on account of its originality this paper was listened to with a great deal of interest. It is not recommended for the sake of economy, but shows that great compressive strength of the resultant concrete can be secured in this way. As an illustration, the paper described a concrete bridge anchorage made in New York City in this way. This suggested that the use of concrete of this type might be introduced for certain special purposes. Comprehensive tests of cubes made of concrete loaded with wire nails were described, and the speaker presented a table of results obtained from such tests. The high cost of such concrete would preclude the use of it to any considerable extent, but the double effect of the entire mass being filled with a tangle of nails gives it a distinctive value of its own.

Prof. Woolson remarked that he had tested concrete cubes reinforced with metal refuse of various kinds, and Chairman Lesley added that some very remarkable and quite unquotable materials, both for aggregate and reinforcement, had been used around cement mills during his long experience in the business, always with good results.

The Waterproofing of Concrete

W. A. Aiken, chemist of the Henry S. Spachman Engineering Company, Philadelphia, presented the report of Committee S on waterproofing, as follows:

Sub-Committees "A" and "B" in charge, respectively, of waterproofing investigations, the former of methods through the treatment of mortars and concretes by the incorporation of foreign substances, non-bituminous in character, the latter of methods through the use of bituminous material applied directly to the surface to be treated, or through cloth or similar mediums, have both pursued the work outlined and reported as under way at the time of our last convention, June, 1908.

Sub-Committee "A" has been unable to develop any lines of investigation materially differing from those determined upon, but the present year's test results very generally corroborate the conclusion previously noted, with the additional positive information that with even such ungraded materials as crushed quartz or standard Ottawa sand, no difficulty is experienced in a laboratory, with its care in operating, in obtaining waterproof mortars in such lean proportions as 1 cement, 4 sand. There is no excuse for failure when a fairly graded natural sand is used with even leaner mortars, confirming the fact that the reason ordinary field concrete mixtures need waterproofing treatment is due either to the use of poor materials or poor proportioning or bad handling, or cumulatively to all of these combined. We think it has been demonstrated and will be generally admitted that with proper materials, proper proportioning and proper handling of the subsequent mixtures, these need no additions of foreign substances to become initially waterproof; that when such addition is needed, for reasons above stated, the desired end can be and is most easily secured mechanically through proper void filling, compensating for the poor proportioning or the poor quality of the original constituents. Any chemical action claimed for mixtures operating towards securing waterproof concrete is apparently nil. Since void filling is to be sought as the panacea of waterproofing ordinary field concrete, comparative tests through the additions of percentages of colloidal clay or hydrated lime and the various advertised waterproofing compounds have been carried on continuously with the conclusion at this date that no general results are obtainable from the additions of patented or proprietary compounds which cannot be obtained equally well through the use of colloidal clay or hydrated lime. Additionally, it seems to be very generally proved by corroborative tests, results of which will be submitted later when long-time results will be available, that, as stated in last year's report, to be likely a weakening in tensile strength in time followed the use of many of the patented compounds, which effect is not generally marked when colloidal clay or hydrated lime is used. It has been continued that the so-called patented compounds fail to remedy defectively proportioned concrete of poor materials as effectively and positively as colloidal clay or hydrated lime, because they do not carry sufficient fine material called for by existing conditions. [illegible] or some of these proprietary compounds at early stages, with the very common loss of strength later on, only confirms the opinion as to their temporary effect being mechanical entirely, in adding, through deposits, to the voids to the desired end, which can be permanently better assured by the use of proper percentages of fine material such as colloidal clay or hydrated lime.

It was a more difficult proposition for Sub-committee "B" to formulate test methods in the case of bituminous waterproofing material; for while the manufacturers of these have been solicited and requested to co-operate with the committee, since it was considered desirable that where so much depended upon the actual application of the material it was essential that these should be placed by the manufacturers themselves, in accordance with their practical methods; up to the present time only six manufacturers have appeared willing to enter into the committee's program. The committee does not pretend to say why all the manufacturers of such materials should not be willing to join in, but the fact remains that our experiments have been limited and unless resort was had to the purchase of such materials and placing of same under test by members of the committee apart from any action of the manufacturers themselves, the number of such materials under test must necessarily remain limited. Our experiments consisted of having built concrete tanks, 18" x 12" x 9" of 1 cement, 3 sand and 5 stone proportions, protected on the inside by each manufacturer with his own material according to his own approved method of application. The methods naturally varied somewhat in individual cases. The bottom and sides of all tanks under treatment were covered with a very lean cement mortar so as to prevent the waterproofing material's immediate contact with the various liquids with which the tanks were later filled. Five-sixteenth-inch (5/16") holes were previously punched through the 3-inch bottoms of the tanks, as originally made and before treatment, so that the effect of the containing liquids, four separate ones being used in every case, might be more rapidly demonstrated by their appearance at the bottom of the tanks. The liquids used were:

First.—Astoria gas drip.

Second.—Seepage water from the sump of the New York Subway at Forty-second Street, which surface water had apparently injuriously affected the bituminous waterproofing material of the original construction.

Third.—This same seepage water with the addition of 5 per cent kerosene by volume.

Fourth.—New York City water made alkaline by the addition of about 23 per cent potash.

After the filling of the tanks, they were regularly inspected, but as results are not complete to date, the attacking effects not being positive in all tanks, it is deemed advisable to withhold any results until complete comparison can be instituted.

The above is simply offered as a report of progress, and respectfully submitted on behalf of the committee.

Clay and Cement Sewer Pipe.

Rudolph Hering, consulting engineer, New York City, presented the report of Committee L, which is charged with the standard specifications for clay and cement sewer pipes. Dr. Hering submitted a progress report only, which follows:

The work of the committee has not for several years been pursued as actively as was hoped and desired. This has been due to the difficulty in obtaining sufficiently authoritative data to permit formulating even preliminary conclusions regarding the strength, durability and fitness of the materials now used as well as others more or less untried. The entire subject was found to be both here and abroad in an unsettled state, due to radical differences of opinion among those who had given the greatest attention to it. Absence of available funds for original investigations by the committee has prevented or delayed securing information which the committee has considered essential. All available data has, however, been compiled, and during the past two or three years increased interest, both in this country and in Europe, has produced much valuable additional information.

A large number of tests have been conducted by several members of the committee, and these results are now available for its use. Attention should be called to the fact that the Committee on Standard Specifications for Clay and Cement Pipe of the International Society for Testing Materials has been at work on the subject for a number of years and has only recently presented a preliminary report regarding certain phases of the subject. The fact that this report was in preparation led your committee to hope that it might form a basis for the work in America, and it was thought wise to await the results of the European investigation before reaching preliminary conclusions in America.

During the last twelve months the chairman, during a visit in Europe, made personal inquiries and examinations into the subject and consulted with some of the active members of the International Association for Testing Materials. He found interest in some quarters and apathy in others. Among the interested parties there were, as here, differences of opinion, chiefly due, however, as he believes, to differences in materials and in their use. He believes that the time has now arrived when useful work in standardizing can be inaugurated in this country with a promise of arriving at practical results.

The Committee of the International Association has done some effective work and its preliminary and tentative report will be of much service to this committee.

A recapitulation of the whole subject, with reference to American needs and on a broader base than the aforesaid report, has been made by the chairman since his return from Europe and during the coming year will be presented to the committee for discussion, elaboration, verification or amendment, with the hope that conclusions may soon be arrived at for a final discussion before the society.

The subject seems best divided into three classes:

1. The demands made upon the sewer pipes. Under this heading all demands relating both to the materials of vitrified clay and cement and to the usual methods of construction, as well as those relating to the several uses of sewers, should be stated.

2. The practical tests which will secure materials and manufacture that will answer these demands. Under this heading should be set forth the qualities of the materials, the efficiency of the manufacture and the actual strength and durability of the different materials and combinations of materials used in different parts of the country, and the serviceability both of the completed pipe line and of its elements.

3. Specifications for the work of laying pipe lines under different conditions. Under this heading should be given conclusions regarding transportation and delivery of the pipe to the site of the work, the preparation of the trench and foundations, the laying and joining of the pipes and the refilling of the trenches, so that the pipes manufactured from the available materials, and laid according to the above conclusions, will furnish in every way a satisfactory and reliable structure.

At this time it is practicable to present as a preliminary basis a list of the demands under Class 1. Much information is available for Class 2 and Class 3, and it is the intention to bring the whole matter under discussion during the coming year, and to complete it by making such additional new tests as the committee may find necessary and as may be practicable.

The demands upon sewer pipes are:

(a) *As to strength.*—This includes resistance against rupture, homogeniety of the material, the age of cement pipe before put into use, and the vitrification of the clay pipes. It includes also the necessary data for the thickness of shell, the importance of fine cracks in vitrified pipes and hair cracks in cement pipes. The proper requirements should be stated for the strength necessary to resist crushing, bursting and impact, under various practical conditions.

(b) *As to durability.*—This includes resistance to wear and tear. There should be given the required resistance against abrasion by sand or gravel at high velocities in glazed and unglazed pipes, the density or specific gravity of the material with relation to its porosity and capilary absorption of moisture. There should be considered the corrosion of glazed and unglazed vitrified clay and Portland cement pipes by acids, alkalies, steam, frost and gases. An inquiry should be made into the merits of protective coatings or linings for Portland cement pipes to resist the usual chemical actions of certain ingredients of sewage.

(c) *As to serviceability.*—This relates to the efficiency of the pipes to perform the best service. Under this heading should be considered the question of smoothness, the glazing of vitrified pipes and blisters; the best sectional form for various purposes, and the warping of pipes, including the permissible deviation from true, straight pipes and regular curves or specials. The best lengths of the individual straight pipes and specials should be determined. The ends of pipes, with reference to making the best joints, should receive most careful study to determine the best practice for different conditions, including hub and spigot, butt and collar, and beveled joints. All specials, such as branches, spurs, curves, etc., should receive attention with reference to recommendations as to their size and form.

With the program thus laid out, the committee is ready to proceed with the work.

Concrete Piers Under Varying Heights and Bearings.

Prof. Edgar Marburg, Pennsylvania University, the indefatigable secretary of the society, presented a paper on Testing Concrete Piers Under Varying Heights and Bearings. The paper considers tests on forty-eight different piers, all made from a uniform mixture of 1:2:4 Portland cement concrete, 12x12" in section and 12, 18, 24 and 30" high. Three piers of each of these heights, respectively, were tested for four different results in compression on the upper surface, as follows: First, with a 12x12" bearing plate. Second, with a square bearing plate of one-half area pier section. Third, with a square bearing plate having one-fourth area of pier section. Fourth, with a hollow rectangular bearing plate representing the difference between the second and third bearings. The practical object of this examination was to find the influence on the strength of the pier by concentration of loading near the center and by concentrated loading along the edges of the bed plate when improperly embedded.

The value of the results set forth in this paper in engineering practice are very great. As it was shown that the carrying capacity of the pier under the fourth type of loading was about as high as that under the second type, in spite of the fact that the bearing surface upon the pier in the one is exactly half as great as the other, is remarkable. The inference is that the outer shell of material unloaded operates in such a way as to assist the resistance of that part in compression.

Rods Embedded in Concrete.

R. A. Cummings read a paper entitled, "Notes on the Bearing Value of Rods Embedded in Concrete," in which he described twenty-four tests of specimens conducted by himself and E. A. McCready. The results indicated that there was little or no difference between ¾" square rods and ¾" round steel rods in reinforced concrete beams.

Report From the Geological Survey Testing Laboratory.

Richard L. Humphrey, engineer in charge of the Structural Materials Testing Laboratories of the United States Geological Survey, gave a clear and concise statement of the progress of the work under his direction. He told of the new laboratories erected and now being equipped on the old arsenal grounds at Pittsburg, Pa., and the closing of the testing station at St. Louis, which has been in operation since 1904. However, some of the tests now in progress at St. Louis will be completed at the abandoned plant, on account of the impracticability of moving the test pieces. He briefly stated the scope of the work now in progress, that already accomplished, and that which is yet to be undertaken by the government laboratories under his direction.

REPORTS OF THE OTHER COMMITTEES.

Hard Drawn Cooper Wire.

J. A. Cupp, General Electric Company, presented the report of committee W. The specification includes round wire, grooved trolley wire, and cable. Tensile strength 49,000 to 67,000 pounds per square inch, according to diameter. Elongation 0.7 per cent to 2.7 per cent in 10 inches. Conductivity 900.8 to 910.2 pounds per mile-ohm. Uniformity of size. Cables must show 90 per cent or the strength of all of its wires. (Passed to letter ballot.)

Brick For Building Purposes.

L. W. Page, Director United States Office of Public Roads, Washington, D. C., presented the report of Committee D. Paving and building brick are being studied by this committee, but only a progress report relating to building brick was offered. Mr. Page mentioned the almost insurmountable difficulty of making specifications broad enough to cover all classes of brick found in the markets, and the following specification was submitted tentatively:

Modulus of rupture to be measured on 7-in. span, brick lying flatwise, center load, the modulus being calculated:

$$f = \frac{3\,W\,l}{2\,b\,d^2}$$

Compressive strength to be determined by crushing flatwise one of the halves obtained in the transverse test; the line of break in the transverse test must be within 1 in. of the middle of the brick or the test repeated.

Brick to be tested for both transverse strength and crushing strength (1) when dry; (2) saturated; (3) after freezing and thawing 20 times. The following figures fix minimum and average values to be met by the brick:

	Modulus of Rupture, lbs. per sq. in.		Crushing Str., lbs. per sq. in.	
Dry	325	400	2,500	3,000
Saturated	225	275	2,000	2,500
After frag. & thaw'g test	225	275	2,000	2,500

The 24-hr. absorption should not exceed 15%.

J. E. Howard, of the Watertown Arsenal Testing Laboratory, objected that the crushing strength indicated was too low, and would have a tendency to discredit the use of brick. He also suggested a better method for testing the absorption of brick than the one in vogue.

Richard L. Humphrey, Chief of the Structural Materials Testing Laboratories, United States Geological Survey, concurred in the objection to the method of specifying absorption, and stated that the flatwise compression test was meaningless and without value. In fact, he said, there was no need for any compression test of brick, as such was not required.

Prof. A. M. Talbot, of Illinois University, and Mr. Page defended the specification, which was accepted and filed for further action.

Code For Pig Iron.

The report of Committee B, relating to the specifications for cast iron and finished castings, presented a code for ordering and sampling pig iron. The specification for each of the elements is expressed by a capital letter, representing the name of the element, and a small letter suffixed thereto denotes the quantity specified. Tabulated, the specification is as follows:

	Code Letter.	Quantity and Percents denoted a	e	i	o	u	y	h
Silicon ..... (0.25 allowed either way)	L	1.00	1.50	2.00	2.50	3.00	3.50	....
Sulphur ..... (maximum)	S	0.04	0.05	0.06	0.07	0.08	0.09	0.10
Total carb.... (minimum)	C	3.00	3.20	3.40	3.60	3.80	....	....
Manganese .. (0.20 allowed either way)	M	0.20	0.40	0.60	0.80	1.00	1.25	1.50
Phosph. ..... (0.15 allowed either way)	P	0.20	0.40	0.60	0.80	1.00	1.25	1.50

NOTE: A further suffix x denotes percentage halfway between quantity letter and next higher value. I. e., Pex denotes Phosphorus 0.50% desired, permissible range 0.35 to 0.65%.

NOTE: In case of Phosphorus and Manganese the percentage stated may be used as maximum or minimum figures if so stated expressly.

EXAMPLE OF USE OF CODE: Li Se Ca Mo Pi specifies pig with Silicon 2.00, Sulphur 0.05, Total Carbon 3.00, Manganese 0.80, Phosphorus 0.60, with variations allowed as above noted.

It was recommended that quotations be passed on iron with 2 per cent silicon, allowing a variable of 0.25 per cent either way and 0.05 per cent sulphur. Tests to be made according to the standard methods of the American Foundrymen's Association. This point and, in fact, the entire specification has been agreed on between Committee B and the American Foundrymen's Association.

Steel Rails and Steel Plates.

Wm. R. Webster, Consulting Engineer, presented the report of Committee A, on specifications for iron and steel, which recommended revision upon the following classifications: Structural steel for ships, structural steel for buildings, boiler plate and steel for rivets, splice bars, tires, bessemer rails, openhearth rails. The 0.05 per cent sulphur specification was challenged and discussed. (Passed to letter ballot.)

Coal Specifications.

Joseph A. Holmes, United States Geological Survey, presented a progress report from Committee O. A number of sections of this committee have been organized to study the production and use of coal from various points of view. The report gave a comprehensive outline of the work of the committee, as well as the deductions drawn from the progress already made on the topic of conservation of resources. The wastefulness in the production of coal was described.

Standard Methods of Annealing Steel.

Prof. H. M. Howe presented the report of Committee F on Heat Treatment of Iron and Steel, giving methods of annealing steel containing a maximum of 0.90 per cent carbon, as follows:

1. Carbon Steel Castings Containing 0.50% Carbon or Less.—Heat to 1,000° C. (1,832° F.) for twelve hours and cool slowly. The temperature should not at any time rise above 1,050° C. (1,922° F.).

2. Rolled and Hammered Steel.—To relieve stress, the effects of cold or cool working, etc., heat to slightly above the absorption point (Ac1, about 730° C. [1,346° F.]), and cool slowly.

The absorption point may be recognized easily, because as the temperature rises past it the rate of rise is momentarily lessened, i. e., the rise itself is slightly retarded spontaneously, and may even be wholly arrested. If the reduction in rolling or hammering has been great enough, so that the coarsening of the grain at the high temperature to which the steel had been heated prior to such rolling or hammering has been well effaced, then carrying the heating for this annealing operation far above the absorption point not only is not beneficial, but is even slightly harmful, and the harm increases with the distance above the absorption point to which the temperature is raised, and also with the percentage of carbon. In other words, heating needlessly far above the absorption point is much more hurtful to high-carbon than to low-carbon steel.

3. To Remedy the Effects of Overheating, as for instance when the metal has for any reason been allowed to cool from a temperature far above the recalescence point, Ar1, without simultaneously undergoing substantial reduction of area by rolling, hammering, or equivalent treatment preventive of harm. In order to remove the effects of such undisturbed cooling from an unduly high temperature, the steel should be reheated to slightly above Ac3, and cooled slowly. To raise the temperature far above Ac3 tends to undo the good done by heating to just above Ac3. If the steel has been overheated very highly or for a very long time, then the length of time during which it must be held above Ac3 should be increased proportionately. This is better than to carry the reheating to a still higher temperature.

4. How to Recognize the Temperature Ac3.—When the carbon content is between 0.45 and 0.90%, Ac3 is the temperature at which the steel loses its magnetism. In steels with carbon content less than 0.45%, Ac3 is above the temperature of the loss of the magnetism. For those steels Ac3 can be calculated roughly by the formula:

Ac3 = 900° — C × 200° in Centigrade degrees.
= 1,652° — C × 360° in Fahrenheit degrees.

In this formula C is the percentage of carbon in the steel. For instance, if the carbon content is 0.30%, then Ac3 is about 900° — 200° × 0.30 = 840° C., or 1,652° — 360° × 0.30 = 1,544° F. This formula indeed applies also to steel with between 0.45 and 0.90% of carbon.

5. Condensed List of the Critical Temperatures Referred to.

The Recalescence, or Ar1, about 700° C. (1,292° F.) independently of the carbon content.

The Absorption Point, or Ac1, about 730° C. (1,346° F.) independently of the carbon content.

Ac3. For steel containing less than 0.90% of carbon, Ac3 can be calculated roughly by the formula:

Ac3 = 900° — C × 200° in Centigrade degrees.
= 1,652° — C × 360° in Fahrenheit degrees.

in which C = the percentage of carbon.

In case of steels containing between 0.45 and 0.90% of carbon, Ac3 corresponds to the loss of magnetism on heating.

A large number of technical papers were read for the attention of the various committees and for the consideration of the Executive Committee. These embrace many practical requirements of steel timber and bituminous and other coatings for structural steel. Each of such papers exhibits marked progress in the studies of their respective subjects, and points out the path for future research to bring these topics to completion.

Progress Report of Joint Committee on Concrete and Reinforced Concrete.

Preliminary draft prepared and submitted by the secretary, October 27. Resubmitted to the joint committee, as revised in accordance with its instructions, December 10, amended and approved for letter ballot by the joint committee, December 11, 1908. Approved by letter ballot, December 20, 1908, by the affiliated committees of American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering and Maintenance of Way Association, Association of American Portland Cement Manufacturers.

Special committees were appointed by the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering and Maintenance of Way Association and the Association of American Portland Cement Manufacturers for the purpose of investigating current practice and providing definite information concerning the properties of concrete and reinforced concrete and to recommend necessary factors and formulas required in the design of structures in which this material is used.

At a meeting of the several special committees representing the above mentioned societies, held at Atlantic City, N. J., June 17, 1904, arrangements were completed for collaborating the work of these several committees through the formation of the Joint Committee on Concrete and Reinforced Concrete. Mr. C. C. Schneider was elected temporary chairman and Prof. A. N. Talbot was elected temporary secretary. The proposed plan of action of the special committee of the American Society of Civil Engineers was outlined, involving the appointment of subcommittees on plan and scope, on tests and on ways and means.

Mr. Schneider and Mr. Schaub, as chairman and secretary of the special committee of the American Society of Civil Engineers, were elected permanent chairman and secretary of the Joint Committee on Concrete and Reinforced Concrete. Mr. Emil Swensson was elected vice-chairman and on the resignation of Mr. Schaub, Mr. Richard L. Humphrey was elected secretary.

The following is the complete organization of the joint committee:

OFFICERS.

Chairman—C. C. Schneider.
Vice-Chairman—Emil Swensson.
Secretary—Richard L. Humphrey.

MEMBERS.

American Society of Civil Engineers (Special Committee on Concrete and Reinforced Concrete):
Greiner, J. E., consulting engineer, Baltimore & Ohio Railroad, Baltimore, Md.
Hatt, W. K., professor of civil engineering, Purdue University, Lafayette, Ind.
Hoff, Olaf, vice-president, Butler Bros., Hoff & Company, New York, N. Y.
Humphrey, Richard L., consulting engineer, engineer in charge, structural materials testing laboratories, U. S. Geological Survey, Philadelphia, Pa.
Lesley, R. W., president, American Cement Company, Philadelphia, Pa.
Schaub, J. W., consulting engineer, Chicago, Ill.
Schneider, C. C., consulting engineer, Philadelphia, Pa.
Swensson, Emil, consulting engineer, Pittsburg, Pa.
Talbot, A. N., professor of municipal and sanitary engineering, in charge of theoretical and applied mechanics, University of Illinois, Urbana, Ill.
Worcester, J. R., consulting engineer, Boston, Mass.

American Society for Testing Materials (Committee on Reinforced Concrete):
Fuller, William B., consulting engineer, New York, N. Y.
Heidenreich, E. Lee, consulting engineer, New York, N. Y.
Richard L. Humphrey, Philadelphia.
Johnson, Albert L., consulting engineer, St. Louis, Mo.
Lanza, Gaetano, professor of theoretical and applied mechanics, Massachusetts Institute of Technology, Boston, Mass.
Robert W. Lesley, Philadelphia.
Marburg, Edgar, professor of civil engineering, University of Pennsylvania, Philadelphia, Pa.
Mills, Charles M., principal assistant engineer, Philadelphia Rapid Transit Company, Philadelphia, Pa.
Moiseff, Leon S., assistant engineer, department of bridges, New York, N. Y.
Quimby, Henry H., assistant engineer of bridges, bureau of surveys, Philadelphia, Pa.
Taylor, W. P., engineer in charge of testing laboratory, Philadelphia, Pa.
Thompson, Sanford E., consulting engineer, Newton Highlands, Mass.
Turneaure, F. E., dean of College of Mechanics and Engineering, University of Wisconsin, Madison, Wis.
Wagner, Samuel Tobias, assistant engineer, Philadelphia & Reading Railroad, Philadelphia, Pa.
Webster, George S., chief engineer, bureau of surveys, Philadelphia, Pa.

American Railway Engineering and Maintenance of Way Association (Sub-Committee on Reinforced Concrete):
Boynton, C. W., inspecting engineer, Universal Portland Cement Company, Chicago, Ill.
Cunningham, A. O., chief engineer, Wabash Railroad, St. Louis, Mo.
Moore, C. H., engineer of grade crossings, Erie Railroad, New York, N. Y.
Scribner, Gilbert H., Jr., contracting engineer, Chicago, Ill.
Swain, George F., professor of civil engineering, Massachusetts Institute of Technology, Boston, Mass.

Association of American Portland Cement Manufacturers (Committee on Concrete and Steel Concrete):
Fraser, Norman D., president, Chicago Portland Cement Company, Chicago, Ill.
Griffiths, R. E., vice-president, American Cement Company, Philadelphia, Pa.
Hagar, Edward M., president, Universal Portland Cement Company, Chicago, Ill.
Newberry, Spencer B., manager, Sandusky Portland Cement Company, Sandusky, Ohio.

The report, herein presented, embodies the present judgment of the committee concerning the proper use of concrete and reinforced concrete.

II. Adaptability of Concrete and Reinforced Concrete.

The adaptability of concrete and reinforced concrete for engineering structures, or parts thereof, is now so well established that it may be considered one of the recognized materials of construction. It has proved to be a satisfactory material, when properly used, for those purposes for which its qualities make it particularly suitable.

1. PROPER USE.—Concrete is a material of very low tensile strength and capable of sustaining but very small tensile deformations without rupture; its value as a structural material depends chiefly upon its durability, its fire-resisting qualities, its strength in compression and its relatively low cost. Its strength increases generally with age.

Plain concrete or massive concrete is well adapted for structural forms in which the principal stresses are compressive. These include foundations, dams, retaining walls and other walls, piers, abutments, short columns and, in many cases, arches. In the design of massive concrete, the tensile strength of the material must generally be neglected.

By the use of metal reinforcement to resist the principal tensile stresses, concrete becomes available for general use in a great variety of structures and structural forms. This combination of concrete and metal is particularly advantageous in the beam, where both compression and tension exist; it is also advantageous in the column where the main stresses are compressive, but where cross-bending may exist. In structures resisting lateral forces it possesses advantages over plain concrete in that it may be so designed as to utilize more fully the strength rather than the weight of the material.

2. IMPROPER USE.—Failures of reinforced concrete structures are usually due to any one or a combination of the following causes: defective design, poor material and faulty execution.

RICHARD L. HUMPHREY, PHILADELPHIA,
Secretary of Joint Committee on Concrete and Reinforced Concrete.

The defects in a design may be many and various. The computations and assumptions on which they were based may be faulty and contrary to the established principles of statics and mechanics; the unit stresses used may be excessive, or the details of the design defective.

The design of reinforced concrete structures should receive at least the same careful consideration as those of steel, and only engineers with sufficient experience and good judgment should be intrusted with such work.

The computations should include all minor details, which are sometimes of the utmost importance. The design should include a detailed study of such connec-reinforcement and should provide for proper connections between the component parts, so that they cannot be displaced. As the connections between reinforced concrete members are frequently a source of weakness, the design should include a detailed study of such connections, accompanied by computations to prove their strength.

The use of high unit stresses, approaching the danger line, is a defect in the design of reinforced concrete structures.

Articulated concrete structures designed in imitation of steel trusses may be mentioned as illustrating a questionable use of reinforced concrete.

Poor material is sometimes used for the concrete, as well as for the reinforcement. The use of inferior concrete is generally due to a lack of experience of the contractor and his superintendents, or to the absence of proper supervision.

An unsuitable quality of steel for reinforcement is sometimes prescribed in specifications, for the purpose of reducing the cost. For steel structures a high grade of material is specified, while the steel used for reinforcing concrete is sometimes made of unsuitable, brittle material.

Faulty execution and careless workmanship may generally be attributed to unintelligent or insufficient supervision.

While other engineering structures upon the safety of which human lives depend are generally designed by engineers employed by the owner, and the contracts let on the engineer's design and specifications, in accordance with legitimate practice, reinforced concrete structures frequently are designed by contractors or by engineers commercially interested, and the contract let for a lump sum.

The construction of buildings in large cities is regulated by ordinances or building laws, and the work is inspected by municipal authorities. For reinforced concrete work, however, the limited supervision which municipal inspectors are able to give is not sufficient. Means for more adequate supervision and inspection should, therefore, be provided.

3. RESPONSIBILITY AND SUPERVISION.—The execution of the work should not be separated from the design, since intelligent supervision and successful execution can be expected only when both functions are combined. The engineer who prepares the design and specifications should therefore have the supervision of the execution of the work.

The committee recommends the following rules for structures of reinforced concrete for the purpose of fixing the responsibility and providing for adequate supervision during construction:

(a) Before work is commenced complete plans shall be prepared, accompanied by specifications, static computations and descriptions showing the general arrangement and all details. The static computations shall give the loads assumed separately, such as dead and live loads, wind and impact, if any, and the resulting stresses.

(b) The specifications shall state the qualities of the materials to be used for making the concrete, and the manner in which they are to be proportioned.

(c) The strength which the concrete is expected to attain after a definite period shall be stated in the specifications.

(d) The drawings and specifications shall be signed by the engineer and the contractor.

(e) The approval of plans and specifications by other authorities shall not relieve the engineer nor the contractor of responsibility.

(f) Inspection during construction shall be made by competent inspectors employed by and under the supervision of the engineer and shall cover the following:

1. The materials.
2. The correct construction and erection of the forms and the supports.
3. The sizes, shapes and arrangement of the reinforcement.
4. The proportioning, mixing and placing of the concrete.
5. The strength of the concrete by tests of standard test pieces made on the work.
6. Whether the concrete is sufficiently hardened before the forms and supports are removed.
7. Prevention of injury to any part of the structure by and after the removal of the forms.
8. Comparison of dimensions of all parts of the finished structure with the plans.

(g) Load tests on portions of the finished structure shall be made where there is reasonable suspicion that the work has not been properly performed, or that, through influences of some kind, the strength has been impaired. Loading shall be carried to such a point that twice the calculated working stresses in critical parts are reached, and such loads shall cause no permanent deformations. Load tests shall not be made until after sixty days of hardening.

4. DESTRUCTIVE AGENCIES.—*a. Corrosion of Metal Reinforcement.*—Tests and experience have proved that steel imbedded in good concrete will not corrode no matter whether located above or below fresh or sea water level. If the concrete is porous so as to be readily permeable to water as where the concrete is laid with a very dry consistency the metal may be corroded in the presence of moisture.

b. Electrolysis.—There is little accurate information available as to the effect of electrolysis on concrete. The few experiments that are available seem to indicate that concrete may be damaged through the leakage of small electrical currents through the mass, particularly where steel is imbedded in the concrete. These experiments are not conclusive, however, and the large numbers of reinforced concrete structures subject to the action of electrolysis in which the metal and concrete are in perfect condition would seem to indicate that the destructive action reported was due to abnormal conditions which do not often occur in practice.

c. Sea Water.—The data available concerning the effect of sea water on concrete or reinforced concrete are inconclusive and limited in amount. There have been no authentic cases reported where the disintegration has proved to be due entirely to sea water. The decomposition that has been reported manifests itself in a number of ways; in some cases the mortar softens and crumbles; in others a crust forms which in time comes off. It has been found, however, that where concrete is proportioned in such a way as to secure a maximum density and is mixed thoroughly, it makes an impervious concrete, upon which sea water has apparently little effect. Sea-walls have been standing for considerable lengths of time without apparent injury. In many of our harbors where the water has been rendered brackish through the rivers discharging into them, the action that has been reported has been at the water line and was probably due in part to freezing.

d Acids.—Concrete of first class quality thoroughly hardened is affected appreciably only by strong acids which seriously injure other materials. A substance like manure, because of the acid in its composition, is injurious to green concrete, but after the concrete has thoroughly hardened it satisfactorily resists such action.

e. Oils.—When concrete is properly made and the surface carefully finished and hardened it resists the action of such oils as petroleum and ordinary engine oils. Certain oils which contain fatty acids appear to produce injurious effects.

f. Alkalies.—The action of alkalies on concrete is problematical. In the reclamation of arid land where the soil is heavily charged with alkaline salts it has been found that concrete, stone, brick, iron and other materials are injured under certain conditions. It would seem that at the level of the ground water such structures are disintegrated, possibly due in part to the effect of formation of crystals resulting from the alternate wetting and drying of the surface of the concrete at this ground water line. Such destructive action can be prevented by the use of an insulating coating which will prevent this action from taking place.

III. Materials.

A knowledge of the properties of the materials entering into concrete and reinforced concrete is the first essential. The importance of the quality of the materials used cannot be overestimated, and not only the cement but also the aggregates should be subject to such definite requirements and tests as will insure a concrete of the required quality.

1. CEMENT.—There are available for construction purposes Portland, Natural and Puzzolan or Slag cements. Only Portland cement is suitable for reinforced concrete.

a. Portland Cement is the finely pulverized product resulting from the calcination to incipient fusion of an intimate mixture of properly proportioned argillaceous and calcareous materials. It has a definite chemical composition varying within comparatively narrow limits.

Portland cement should be used in reinforced concrete construction and any construction that will be subject to shocks or vibrations or stresses other than direct compression.

b. Natural Cement is the finely pulverized product resulting from the calcination of an argillaceous limestone at a temperature only sufficient to drive off the carbonic acid gas. While the limestone must have a certain composition, this composition may vary in much wider limits than in the case of Portland cement. Natural cement does not develop its strength as quickly nor is it as uniform in composition as Portland cement.

Natural cement may be used in massive masonry where weight rather than strength is the essential feature.

Where economy is the governing factor a comparison may be made between the use of Natural cement and a leaner mixture of Portland cement that will develop the same strength.

c. Puzzolan or Slag Cement is the finely pulverized product resulting from grinding a mechanical mixture of granulated basic blast furnace slag and hydrated lime.

Puzzolan cement is not nearly as strong, uniform or reliable as Portland or Natural cement, is not extensively used and never in important work; it should be used only for foundation work underground where it is not exposed to air or running water.

d. Specifications.—The cement should meet the requirements of the Standard Specifications for Cement (see Appendix p. 37). A number of societies have been working on methods for testing and specifications for cement. The best practice seems to be represented in the standard methods of testing and specifications for cement which are the result of the joint labors of special committees of the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering and Maintenance of Way Association, American Institute of Architects and others.

2. AGGREGATES.—Extreme care should be exercised in selecting the aggregates for mortar and concrete, and careful tests made of the materials for the purpose of determining their qualities and the grading necessary to secure maximum density* or a minimum percentage of voids.

a. Fine Aggregate consists of sand, crushed stone, or gravel screenings, passing when dry a screen having ¼-inch diameter holes. It should be preferably of siliceous material, clean, coarse, free from vegetable loam or other deleterious matter.

A gradation of the grain from fine to coarse is generally advantageous.

Mortars composed of one part Portland cement and three parts fine aggregate by weight when made into briquettes should show a tensile strength of at least 70 per cent of the strength of 1:3 mortar of the same consistency made with the same cement and standard Ottawa sand.

b. Coarse Aggregate consists of inert material, such as crushed stone, or gravel, which is retained on a screen having ¼-inch diameter holes. The particles should be clean, hard, durable and free from all deleterious material. Aggregates containing soft, flat or elongated particles should be excluded from important structures. A gradation of sizes of the particles is generally advantageous.

The maximum size of the coarse aggregate shall be such that it will not separate from the mortar in laying and will not prevent the concrete from fully surrounding the reinforcement or filling all parts of the forms. Where concrete is used in mass the size of the coarse aggregate may be such as to pass a 3-inch ring. For reinforced members a size to pass a 1-inch ring or a smaller size may be used.

Cinder concrete is not suitable for reinforced concrete structures and may be safely used only in mass for very light loads or for fireproofing.

Where cinder concrete is permissible the cinders used as the coarse aggregate should be composed of hard, clean, vitreous clinker, free from sulphides, unburned coal or ashes.

3. WATER.—The water used in mixing concrete should be free from oil, acid, strong alkalies or vegetable matter.

4. METAL REINFORCEMENT.—The committee recommends as a suitable material for reinforcement steel filling the requirements of the specifications adopted by the American Railway Engineering and Maintenance of Way Association (Appendix, p. 43).

For the reinforcement of slabs, small beams or minor details or for the prevention of shrinkage cracks where wire or small rods are suitable, material conforming to the requirements of either specification A or B given in the Appendix (page 45) may be used.

The reinforcement should be free from rust, scale or coatings of any character which would tend to reduce or destroy the bond.

IV. Preparation and Placing of Mortar and Concrete.

1. PROPORTIONS.—The materials to be used in concrete should be carefully selected, of uniform quality and proportioned with a view to securing as nearly as possible a maximum density.

a. Unit of Measure.—The unit of measure should be the barrel, which should be taken as containing 3.8 cubic feet. Four bags containing ninety-four pounds of cement each should be considered the equivalent of one barrel. Fine and coarse aggregate should be measured separately as loosely thrown into the measuring receptacle.

b. Relation of Fine and Coarse Aggregate.—The fine and coarse aggregate should be used in such relative proportions as will insure maximum density. In unimportant work it is sufficient to do this by individual judgment, using correspondingly higher proportions of cement; for important work these proportions should be carefully determined by density experiments and the sizing of the fine and coarse aggregates should be uniformly maintained or the proportions changed to meet the varying sizes.

c. Relation of Cement and Aggregates.—For reinforced concrete construction a density proportion based on 1:6 should generally be used; *i. e.*, one part of cement to a total of six parts of fine and coarse aggregates measured separately.

In columns richer mixtures are often required, while for massive masonry or rubble concrete a leaner mixture of 1:9 or even 1:12 may be used. These proportions should be determined by the strength or wearing qualities required in the construction at the critical period of its use. Experienced judgment based on individual observation and tests of similar conditions in similar localities is the best guide as to the proper proportions for any particular case.

2. MIXING.—The ingredients of concrete should be thoroughly mixed to the desired consistency, and the mixing should continue until the cement is uniformly distributed and the mass is uniform in color and homogeneous, since maximum density and therefore greatest strength of a given mixture depends largely on thorough and complete mixing.

a. Measuring Ingredients.—Methods of measurements of the proportions of the various ingredients, including the water, should be used, which will secure separate uniform measurements at all times.

b. Machine Mixing.—When the conditions will permit, a machine of a type which insures the uniform proportioning of the materials throughout the mass should be used, since a more thorough and uniform consistency can be thus obtained.

c. Hand Mixing.—When it is necessary to mix by hand the mixing should be on a water-tight platform and especial precautions should be taken to turn the materials until they are homogeneous in appearance and color.

d. Consistency.—The materials should be mixed wet enough to produce a concrete of such a consistency as will flow into the forms and about the metal reinforcement, and which, at the same time, can be conveyed from the mixer to the forms without separation of the coarse aggregate from the mortar.

e. Retempering.—Retempering mortar or concrete—*i. e.*, remixing with water after it has partially set—should not be permitted.

3. PLACING OF CONCRETE.—*a. Methods.*—Concrete after the addition of water to the mix should be handled rapidly, and in as small masses as is practicable, from the place of mixing to the place of final deposit, and under no circumstances should concrete be used that has partially set before final placing. A slow setting cement should be used when a long time is likely to occur between mixing and final placing.

The concrete should be deposited in such a manner as will permit the most thorough compacting, such as can be obtained by working with a straight shovel or slicing tool kept moving up and down until all the ingredients have settled in their proper place by gravity and the surplus water has been forced to the surface.

In depositing the concrete under water special care should be exercised to prevent the cement from being floated away, and to prevent the formation of laitance which hardens very slowly and forms a poor surface on which to deposit fresh concrete. Laitance is formed in both still and running water, and should be removed before placing fresh concrete.

Before placing the concrete care should be taken to see that the forms are substantial and thoroughly wetted and the space to be occupied by the concrete free from debris. When the placing of the concrete is suspended, all necessary grooves for joining future work should be made after the concrete has had time to set.

When work is resumed, concrete previously placed should be roughened, thoroughly cleansed for foreign material and laitance, drenched and slushed with a mortar consisting of one part Portland cement and not more than two parts fine aggregate.

The faces of concrete exposed to premature drying should be kept wet for a period of at least seven days.

b. Freezing Weather.—Concrete for reinforced structures should not be mixed or deposited at a freezing temperature, unless special precautions are taken to avoid the use of materials containing frost or covered with ice crystals, and to provide means to prevent the concrete from freezing after being placed in position and until it has thoroughly hardened.

c. Rubble Concrete.—Where the concrete is to be deposited in massive work its value may be improved and its cost materially reduced through the use of clean stones thoroughly embedded in the concrete as near together as is possible and still entirely surrounding by concrete.

V. Forms.

Forms should be substantial and unyielding, so that the concrete shall conform to the designed dimensions and contours, and should be tight to prevent the leakage of mortar.

The time for removal of forms is one of the most important steps in the erection of a structure of concrete or reinforced concrete. Care should be taken to inspect the concrete and ascertain its hardness before removing the forms.

So many conditions affect the hardening of concrete that the proper time for the removal of the forms should be decided by some competent and responsible person, especially where the atmospheric conditions are unfavorable.

VI. Details of Construction.

1. JOINTS.—*a. Reinforcement.*—Wherever in tension reinforcement it is necessary to splice the reinforcing bars the length of lap shall be determined on the basis of the safe bond stress and the stress in the bar at the point of splice; or a connection shall be made between the bars of sufficient strength to carry the stress. Splices at points of maximum stress should be avoided. In columns large bars should be properly butted and spliced; small bars may be treated as indicated for tension reinforcement or their stress may be taken off by being imbedded in large masses of concrete. At foundations, bearing plates should be provided for large bars or structural forms.

b. Concrete.—For concrete construction it is desirable to cast the entire structure at one operation, but as this is not always possible, especially in large structures, it is necessary to stop the work at some convenient point. This point should be selected so that the resulting joint may have the least possible effect on the strength of the structure. It is therefore recommended that the joint in columns be made flush with the lower side of the girders; that the joints in girders be at a point midway between supports, but should a beam intersect a girder at this point the joint should be offset a distance equal to twice the width of the beam; that the joints in the members of a floor system should in general be made at or near the center of the span.

Joints in columns should be perpendicular to the axis of the column and in girders, beams and floor slabs perpendicular to the plane of their surfaces.

2. SHRINKAGE.—Girders should never be constructed over freshly formed columns without permitting a period of at least two hours to elapse, thus providing for settlement or shrinkage in the columns. Before resuming work the top of the column should be thoroughly cleansed of foreign matter and laitance. If the concrete in the column has become hard the top should also be drenched and slushed with a mortar consisting of one part Portland cement and not more than two parts fine aggregate before placing additional concrete.

3. TEMPERATURE CHANGES.—Concrete is sensitive to temperature changes and it is necessary to take this fact into account in designing and erecting concrete structures. In some positions the concrete is subjected to a much greater fluctuation in temperature than in others, and in such cases joints are necessary. The frequency of these joints will depend, first, upon the range of temperature to which concrete will be subjected; second, upon the quantity and position of the reinforcement. These points should be determined and provided for in the design. In massive work, such as retaining walls, abutments, etc., built without reinforcement, joints should be provided, approximately, every fifty feet throughout the length of the structure. To provide against the structures being thrown out of line by unequal settlement, each section of the wall may be tongued and grooved into the adjoining section. To provide against unsightly cracks, due to unequal settlement, a joint should be made at all sharp angles.

4. FIREPROOFING.—The actual fire tests of concrete and reinforced concrete have been limited, but experience, together with the results of tests so far made, indicate that concrete may be safely used for fireproofing purposes. Concrete itself is incombustible and reasonably proof against fire when composed of a silicious sand and a hard coarse aggregate such as igneous rock.

For a fireproof covering these same materials may be used or clean hard burned cinders may be substituted for the coarse aggregate.

The low rate of heat conductivity of concrete is one reason for its value for fireproofing. The dehydration of the water of crystallization of concrete probably begins at about 500 degrees F. and is completed at about 900 degrees F., but experience indicates that the volatization of the water absorbs heat from the surrounding mass, which, together with the resistance of the air cells, tends to increase the heat resistance of the concrete, so that the process of dehydration is very much retarded. The concrete that is actually affected by fire remains in position and affords protection to the concrete beneath it.

It is recommended that in monolithic concrete columns the concrete to a depth of one and one-half inches be considered as protective covering and not included in the effective section.

The thickness of the protective coating required depends upon the probable duration of a fire which is likely to occur in the structure and should be based on the rate of heat conductivity. The question of the conductivity of concrete is one which requires further study and investigation before a definite rate for different classes of concrete can be fully established. However, for ordinary conditions it is recommended that the metal in girders and columns be protected by a minimum of two inches of concrete; that the metal in beams be protected by a minimum of one and one-half inches of concrete, and that the metal in floor slabs be protected by a minimum of one inch of concrete.

It is recommended that the corners of columns, girders and beams be beveled or rounded, as a sharp corner is more seriously affected by fire than a round one.

5. WATERPROOFING.—Many expedients have been used to render concrete impervious to water under normal conditions, and also under pressure conditions that exist in reservoirs, dams and conduits of various kinds. Experience shows, however, that where mortar or concrete is proportioned to obtain the greatest practicable density and is mixed to a rather wet consistency, the resulting mortar or concrete is impervious under ordinary conditions. A concrete of dry consistency is more or less pervious to water, and compounds of various kinds have been mixed with the concrete, or applied as a wash to the surface for the purpose of making it water-tight. Many of these compounds are of but temporary value, and in time lose their power of imparting impermeability to the concrete.

In the case of subways, long retaining walls and reservoirs leakage cracks may be prevented by horizontal and vertical reinforcement, properly proportioned and located, provided the concrete itself is impervious.

Such reinforcement distributes the stretch due to contraction or settlement so that the cracks are too minute to permit leakage, or are soon closed by infiltration of silt.

Asphaltic or coal tar preparations applied either as a mastic or as a coating on felt or cloth fabric are used for waterproofing, and should be proof against injury by liquids or gases.

6. SURFACE FINISH.—Concrete is a material of an individual type and should not be used in imitation of other structural materials. One of the important problems connected with the use of concrete is the character of the finish of exposed surfaces. The finish of the surface should be determined before the concrete is placed, and the work conducted so as to make possible the finish desired. For many forms of construction the natural surface of the concrete is unobjectionable, but frequently the marks of the boards and the flat dead surface are displeasing, making some special treatment desirable. A treatment of the surface which removes the film of mortar and brings the coarser particles of the concrete into relief is frequently used to remove the form markings, break the monotonous appearance of the surface, and make it more pleasing. Plastering of surfaces should be avoided, for the other methods of treatment are more reliable and usually much more satisfactory. Plastering, even if carefully applied, is likely to peel off under action of frost or temperature changes.

* A convenient coefficient of density is the ratio of the sum of the volumes of materials contained in a unit volume to the total unit volume.

VII. Design.

1. MASSIVE CONCRETE.—In the design of massive concrete or plain concrete no account should be taken of the tensile strength of the material, and sections should usually be so proportioned as to avoid tensile stresses. This will generally be accomplished, in the case of rectangular shapes, if the line of pressure is kept within the middle third of the section, but in very large structures, such as high masonry dams, a more exact analysis may be required. Structures of massive concrete are able to resist unbalanced lateral forces by reason of their weight; hence the element of weight rather than strength often determines the design. A relatively cheap and weak concrete will therefore often be suitable for massive concrete structures. Owing to its low extensibility, the contraction due to hardening and to temperature changes requires special consideration, and, except in the case of very massive walls such as dams, it is desirable to provide joints at intervals to localize the effect of such contraction. The spacing of such joints will depend upon the form and dimensions of the structure and its degree of exposure.

Massive concrete may well be used for piers and short columns in which the ratio of length to least width is relatively small. Under ordinary conditions this ratio should not exceed six, but where the central application of the load is assured a somewhat higher value may safely be used.

Massive concrete is also a suitable material for arches of moderate span where the conditions as to foundations are favorable.

2. REINFORCED CONCRETE.—By the use of metal reinforcement to resist the principal tensile stresses concrete becomes available for general use in a great variety of structures and structural forms. This combination of concrete and steel is particularly advantageous in the beam where both compression and tension exist; it is also advantageous in the column where the main stresses are compressive, but where cross bending may exist. The theory of design will therefore relate mainly to the analysis of beams and columns.

3. GENERAL ASSUMPTIONS.—*a. Loads.*—The loads or forces to be resisted consist of:

1. *The dead load*, which includes the weight of the structure and fixed loads and forces.
2. *The live load* or the loads and forces which are variable. The dynamic effect of the live load will often require consideration. Any allowance for the dynamic effect is preferably taken into account by adding the desired amount to the live load or to the live load stresses. The working stresses hereinafter recommended are intended to apply to the equivalent static stresses so determined.

In the case of high buildings the live load on columns may be reduced in accordance with the usual practice.

b. Lengths of Beams and Columns.—The span length for beams and slabs shall be taken as the distance from center to center of supports, but shall not be taken to exceed the clear span plus the depth of beam or slab. Brackets shall not be considered as reducing the clear span in the sense here intended.

The length of columns shall be taken as the maximum unsupported length.

c. Internal Stresses.—As a basis for calculations relating to the strength of structures the following assumptions are recommended:

1. Calculations should be made with reference to working stresses and safe loads rather than with reference to ultimate strength and ultimate loads.
2. A plane section before bending remains plane after bending.
3. The modulus of elasticity of concrete in compression within the usual limits of working stresses is constant. The distribution of compressive stresses in beams is therefore rectilinear.
4. In calculating the moment of resistance of beams the tensile stresses in the concrete shall be neglected.
5. Perfect adhesion is assumed between concrete and reinforcement. Under compressive stresses the two materials are therefore stressed in proportion to their moduli of elasticity.
6. The ratio of the modulus of elasticity of steel to the modulus of elasticity of concrete may be taken at fifteen.
7. Initial stress in the reinforcement due to contraction or expansion in the concrete may be neglected.

It is appreciated that the assumptions herein given are not entirely borne out by experimental data. They are given in the interest of simplicity and uniformity, and variations from exact conditions are taken into account in the selection of formulas and working stresses.

For calculations relative to deflections the tensile strength of the concrete should be taken into account. For such calculations, also, a value of 8 to 12 for the ratio 6 the moduli corresponds more nearly to the actual conditions and may well be used.

4. TEE BEAMS.—In beam and slab construction an effective bond should be provided at the junction of the beam and slab. When the principal slab reinforcement is parallel to the beam, transverse reinforcement should be used extending over the beam and well into the slab.

Where adequate bond between slab and web of beam is provided the slab may be considered as an integral part of the beam, but its effective width shall be determined by the following rules:

a. It shall not exceed one-fourth of the span length of the beam;
b. Its overhanging width on either side of the web shall not exceed four times the thickness of the slab.

In the design of tee beams acting as continuous beams, due consideration should be given to the compressive stresses at the support.

5. FLOOR SLABS.—Floor slabs should be designed and reinforced as continuous over the supports. If the length of the slab exceeds 1.5 times its width the entire load should be carried by transverse reinforcement. Square slabs may well be reinforced in both directions.*

The loads carried to beams by slabs which are reinforced in two directions will not be uniformly distributed to the supporting beam but may be assumed to vary in accordance with the ordinates of a triangle. The moments in the beams should be calculated accordingly.

6. CONTINUOUS BEAMS AND SLABS.—When the beam or slab is continuous over its supports, reinforcement should be fully provided at points of negative moment. In computing the positive and negative moments in beams and slabs continuous over several supports, due to uniformly distributed loads, the following rules are recommended:

a. That for floor slabs the bending moments at center and at support be taken at $\frac{wl^2}{12}$ for both dead and live loads, where w represents the load per lineal foot and l the span length.

b. That for beams the bending moment at center and at support for interior spans be taken at $\frac{wl^2}{12}$, and for end spans it be taken at $\frac{wl^2}{10}$ for center and adjoining support, for both dead and live loads.

In the case of beams and slabs continuous for two spans only, or of spans of unusual length, more exact calculations should be made. Special consideration is also required in the case of concentrated loads.

Where beams are reinforced on the compression side, the steel may be assumed to carry its proportion of stress in accordance with the provisions of Chapter VII, Section 3, c-6. In the case of continuous beams, tensile and compressive reinforcement over supports must extend sufficiently beyond the support to develop the requisite bond strength.

7. BOND STRENGTH AND SPACING OF REINFORCEMENT.—Adequate bond strength should be provided in accordance with the formula hereinafter given. Where a portion of the reinforcement is bent up near the end of a beam, the bond stress in the remaining straight reinforcement will be less than is represented by the theoretical formula.

Where high bond resistance is required, the deformed bar is a suitable means of supplying the necessary strength. Adequate bond strength throughout the length of a bar is preferable to end anchorage, but such anchorage may properly be used in special cases. Anchorage furnished by short bends at a right angle is less effective than hooks consisting of turns through 180 degrees.

The lateral spacing of parallel bars should not be less than two and one-half diameters, center to center, nor should the distance from the side of the beam to the center of the nearest bar be less than two diameters. The clear spacing between two layers of bars should not be less than ½ inch.

8. SHEAR AND DIAGONAL TENSION.—Calculations for web resistance shall be made on the basis of maximum shearing stress as determined by the formulas hereinafter given. When the maximum shearing stresses exceed the value allowed for the concrete alone, web reinforcement must be provided to aid in carrying the diagonal tension stresses. This web reinforcement may consist of bent bars, or inclined or vertical members attached to or looped about the horizonal reinforcement. Where inclined members are used, the connection to the horizontal reinforcement shall be such as to insure against slip.

Experiments bearing on the design of details of web reinforcement are not yet complete enough to allow more than general and tentative recommendations to be made. It is well established, however, that a very moderate amount of reinforcement, such as is furnished by a few bars bent up at small inclination, increases the strength of a beam against failure by diagonal tension to a considerable degree; and that a sufficient amount of web reinforcement can readily be provided to increase the shearing resistance to a value from three or more times that found when the bars are all horizontal and no web reinforcement is used. The following allowable values for the maximum shearing stress are therefore recommended, based on the working stresses of Chapter VIII, p. 35:

a. For beams with horizontal bars only 40 pounds per square inch.
b. For beams in which a part of the horizontal reinforcement is used in the form of bent-up bars, arranged with due respect to the shearing stresses, a higher value may be allowed, but not to exceed 60 pounds per square inch.
c. For beams thoroughly reinforced for shear a value not exceeding 120 pounds per square inch.

In the calculation of web reinforcement to provide the strength required under c above, the concrete may be counted upon as carrying one-third of the shear. The remainder is to be provided for by means of metal reinforcement consisting of bent bars or stirrups, but preferably both. The requisite amount of such reinforcement may be estimated on the assumption that the entire shear on a section, less the amount assumed to be carried by the concrete, is carried by the reinforcement in a length of beam equal to its depth.

The longitudinal spacing of stirrups or bent rods shall not exceed three-fourths the depth of the beam.

It is important that adequate bond strength be provided to develop fully the assumed strength of all shear reinforcement.

Inasmuch as small deformations in the horizontal reinforcement tends to prevent the formation of diagonal cracks, a beam will be strengthened against diagonal tension failure by so arranging the horizontal reinforcement that the unit stresses at points of large shear shall be relatively low.

9. COLUMNS. It is recommended that the ratio of unsupported length of column to its least width be limited to 15.

The effective area of the column shall be taken as the area within the protective covering, as defined in Chapter VI, Section 4, or in the case of hooped columns or columns reinforced with structural shapes it shall be taken as the area within the hooping or structural shapes.

Columns may be reinforced by means of longitudinal bars, by bands or hoops, by bands or hoops together with longitudinal bars, or by structural forms which in themselves are sufficiently rigid to act as columns. The general effect of bands or hoops is greatly to increase the "toughness" of the column and its ultimate strength, but hooping has little effect upon its behavior within the limit of elasticity. It thus renders the concrete a safer and more reliable material and should permit the use of a somewhat higher working stress. The beneficial effects of "toughening" are adequately provided by a moderate amount of hooping, a larger amount serving mainly to increase the ultimate strength and the possible deformation before ultimate failure.

The following recommendations are made for the relative working stresses in the concrete for the several types of columns:

a. Columns with longitudinal reinforcement only, the unit stress recommended for axial compression in Chapter VIII, Section 3.
b. Columns with reinforcement of bands or hoops, as hereinafter specified, stresses 20 per cent higher than given for *a*.
c. Columns reinforced with not less than 1 per cent and not more than 4 per cent of longitudinal bars and with bands or hoops, stresses 45 per cent higher than given for *a*.
d. Columns reinforced with structural steel column units which thoroughly encase the concrete core, stresses 45 per cent higher than given for *a*.

In all cases longitudinal reinforcement is assumed to carry its proportion of stress in accordance with Section 3. The hoops or bands are not to be counted upon directly as adding to the strength of the column.

Bars composing longitudinal reinforcement shall be straight and shall have sufficient lateral support to be securely held in place until the concrete has set.

Where bands or hoops are used, the total amount of such reinforcement shall be not less than 1 per cent of the volume of the column enclosed. The clear spacing of such bands or hoops shall not be greater than one-fourth the diameter of the enclosed column. Adequate means must be provided to hold bands or hoops in place so as to form a column, the core of which shall be straight and well centered.

Bending stresses due to eccentric loads must be provided for by increasing the section until the maximum stress does not exceed the values above specified.

10. REINFORCING FOR SHRINKAGE AND TEMPERATURE STRESSES.—Where large areas of concrete are exposed to atmospheric conditions, the changes of form due to shrinkage (resulting from hardening) and to action of temperature are such that large cracks will occur in the mass, unless precautions are taken to so distribute the stresses as either to prevent the cracks altogether or to render them very small. The size of the cracks will be directly proportional to the diameter of the reinforcing bars and inversely proportional to the percentage of reinforcement and also to its bond resistance per unit of surface area. To be most effective thereforre reinforcement should be placed near the exposed surface and well distributed, and a form in reinforcement used which will develop a high bond resistance.

VIII. Working Stresses.

1. GENERAL ASSUMPTIONS.—The following working stresses are recommended for static loads. Proper allowances for vibration and impact are to be added to live loads where necessary to produce an equivalent static load before applying the unit stresses in proportioning parts.

In selecting the permissible working stress to be allowed on concrete, we should be guided by the working stresses usually allowed for other materials of construction, so that all structures of the same class but composed of different materials may have approximately the same degree of safety.

The stresses for concrete are proposed for concrete composed of one part Portland cement and six parts of aggregate, capable of developing an average compressive strength of 2,000 pounds per square inch at 28 days, when tested in cylinders 8 inches in diameter and 16 inches long, under laboratory conditions of manufacture and storage, using the same consistency as is used in the field. In considering the factors recommended with relation to this strength, it is to be borne in mind that the strength at 28 days is by no means the ultimate which will be developed at a longer period, and therefore they do not correspond with the real factor of safety. On concretes, in which the material of the aggregate is inferior, all stresses should be proportionately reduced, and similar deduction should be made when leaner mixes are to be used. On the other hand, if, with the best quality of aggregates, the richness is increased, an increase may be made in all working stresses proportional to the increase in compressive strength at 28 days, but this increase shall not exceed 25 per cent.

2. BEARING.—When compression is applied to a surface of concrete larger than the loaded area, a stress of 32.5 per cent of the compressive strength at 28 days, or 650 pounds per square inch on the above described concrete, may be allowed. This pressure is probably unnecessarily low when the ratio of the stressed area to the whole area of the concrete is much below unity, but is recommended for general use rather than a variable unit based upon this ratio.

3. AXIAL COMPRESSION.—For concentric compression on a plain concrete column or pier, the length of which does not exceed 12 diameters, 22.5 per cent of the compressive strength at 28 days, or 450 pounds per square inch on 2,000 pounds concrete, may be allowed.

For other forms of columns the stresses obtained from the ratios given in Chapter VII, Section 9, may govern.

4. COMPRESSION IN EXTREME FIBER.—The extreme fiber stress of a beam, calculated on the assumption of a constant modulus of elasticity for concrete under working stresses may be allowed to reach 32.5 per cent of the compressive strength at 28 days, or 650 pounds per square inch for 2,000 pounds concrete. Adjacent to the support of continuous beams stresses 15 per cent higher may be used.

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* The exact distribution of load on square and rectangular slabs, supported on four sides and reinforced in both directions, cannot readily be determined. The following method of calculation is recognized to be faulty, but it is offered as a tentative method which will give results on the safe side. The distribution of load is first to be determined by the formula

$$r = \frac{l^4}{l^4 + b^4}$$

in which r = proportion of load carried by the transverse reinforcement, l = length and b = breadth of slab. For various ratio of l/b the values of r are as follows:

l/b	r
1	0.50
1.1	0.59
1.2	0.67
1.3	0.75
1.4	0.80
1.5	0.83

Using the values above specified each set of reinforcement is to be calculated in the same manner as slabs having supports on two sides only, but the total amount of reinforcement thus determined may be reduced 25 per cent by gradually increasing the rod spacing from the third point to the edge of the slab.

5. SHEAR AND DIAGONAL TENSION.—Where pure shearing stress occurs, that is, uncombined with compression normal to the shearing surface, and with all tension normal to the shearing plane provided for by reinforcement, a shearing stress of 6 per cent of the compressive strength at 28 days, or 120 pounds per square inch on 2,000 pounds concrete, may be allowed. Where the shear is combined with an equal compression, as on a section of a column at 45 degrees with the axis, the stress may equal one-half the compressive stress allowed. For ratios of compressive stress to shear intermediate between 0 and 1, proportionate shearing stress shall be used.

In calculations on beams in which diagonal tension is considered to be taken by the concrete the vertical shearing stresses should not exceed 2 per cent of the compressive strength at 28 days, or 40 pounds per square inch for 2,000 pounds concrete.

6. BOND.—The bonding stress between concrete and plain reinforcing bars may be assumed at 4 per cent of the compressive strength at 28 days, or 80 pounds per square inch for 2,000 pounds concrete, in the case of drawn wire 2 per cent or 40 pounds on 2,000 pounds concrete.

7. REINFORCEMENT.—The tensile stress in steel should not exceed 16,000 pounds per square inch. The compressive stress in reinforcing steel should not exceed 16,000 pounds per square inch, or 15 times the working compressive stress of the concrete.

In structural steel members the working stresses adopted by the American Railway Engineering and Maintenance of Way Association are recommended.

8. MODULUS OF ELASTICITY.—The value of the modulus of elasticity of concrete has a wide range, depending upon the materials used, the age, the range of stresses between which it is considered, as well as other conditions. It is recommended that in all computations it be assumed as one-fifteenth that of steel, as, while not rigorously accurate, this assumption will give safe results.

Building Shows Gain of 12 Per Cent.

Building operations continue to show heavy gains in all parts of the country. In the accompanying table, which has been compiled from official reports to ROCK PRODUCTS, it will be seen that permits were taken out in June in fifty of the leading cities for the construction of 14,880 buildings at an estimated cost of $57,614,974, against 13,443 buildings aggregating in cost $51,443,406 for the same month a year ago, an increase of 1,437 buildings and $6,170,568, a gain of 12 per cent. The figures in detail are as follows:

	1909		1908		
	No. of Estimated Bldgs.	Cost.	No. of Estimated Bldgs.	Cost.	Per Cent G'n. L's.
New York, including Manhattan and Bronx	251	$11,704,725	278	$16,969,190	.. 31
Chicago	1,198	8,271,050	1,103	6,561,225	26 ..
Philadelphia	1,609	4,156,690	1,286	3,017,045	38 ..
San Francisco	....	2,983,423	....	2,573,776	16 ..
Minneapolis	695	2,338,515	561	877,020	167 ..
Pittsburg	440	2,300,068	375	938,149	145 ..
Washington	721	2,236,658	536	1,203,883	86 ..
St. Louis	906	1,951,254	841	1,942,736	.. 2
St. Paul	531	1,749,198	308	641,755	166 ..
Seattle	1,357	1,656,425	1,089	1,280,033	29 ..
Milwaukee	580	1,270,515	468	1,250,442	2 ..
Newark, N. J.	245	1,148,614	221	751,208	53 ..
Los Angeles	715	1,148,418	626	757,856	52 ..
Buffalo	362	1,063,000	240	600,000	77 ..
Rochester, N. Y.	325	1,061,268	159	485,953	118 ..
Detroit	349	935,780	424	1,338,150	.. 30
Portland	400	865,300	385	841,065	3 ..
Denver	349	853,385	329	1,340,105	.. 36
Indianapolis	382	709,537	396	494,731	43 ..
Spokane	261	701,170	322	504,203	39 ..
Salt Lake City	88	680,700	83	194,900	249 ..
Baltimore	257	675,275	435	858,651	.. 21
Richmond, Va.	98	605,510	127	246,707	146 ..
Omaha	155	562,280	132	450,160	25 ..
Tacoma	174	540,843	208	289,659	104 ..
Oakland	150	523,363	216	438,467	19 ..
Atlanta	336	431,976	359	464,396	.. 7
New Orleans	...	408,233	...	415,139	.. 2
Columbus	184	401,470	169	507,383	.. 21
Louisville	256	384,234	277	198,178	94 ..
Paterson, N. J.	121	355,785	54	126,834	181 ..
Memphis	243	355,521	248	354,855	.. ..
Des Moines	71	259,782	38	68,475	279 ..
Grand Rapids	142	259,250	125	200,519	29 ..
Toledo	133	244,088	107	186,200	31 ..
Sacramento, Cal.	9	221,144	7	284,588	.. 23
Cedar Rapids	38	215,000	20	93,900	129 ..
Dallas	107	203,966	118	129,860	57 ..
Birmingham	101	196,781	102	553,895	.. 64
Duluth, Minn.	114	184,850	172	301,745	.. 40
Harrisburg	34	180,000	31	240,150	.. 25
Lincoln	75	170,829	42	74,525	129 ..
St. Joseph, Mo.	89	156,271	89	97,748	60 ..
Chattanooga, Tenn.	159	124,598	153	49,805	150 ..
Stockton	26	81,229	24	42,361	92 ..
Terre Haute, Ind.	81	70,355	64	55,952	26 ..
Mobile, Ala.	31	43,777	30	45,802	.. 4
South Bend	27	31,930	31	64,735	.. 51
Davenport	7	19,450	15	46,395	.. 58
Pueblo	28	15,030	14	12,860	22 ..
Total	14,880	$57,614,974	13,443	$51,443,406	12 ..

In fifteen of the fifty cities there were decreases. This is not large in number and for the most part they have very little influence upon the general situation, with perhaps the exception of New York City, in which it seems difficult to reconcile a decrease from the figures a year ago, $16,969,190 to $11,704,725, or 31 per cent, for the month just closed. A decrease of four or five million dollars, even in a city in which the totals are so big, is an important matter, but it will be readily appreciated that the granting of permits for two or three unusually big buildings in June a year ago and their absence this year would bring this about. The decrease in the other cities cut very little figure, as they are in places where building has been active for a long time and are now in a fairly healthy state, and they are so remote that they have little bearing on the general situation.

The Right Way to Build Walks and Floors.

As numerous inquiries have reached this office from subscribers desiring full instructions with regard to the construction of concrete walks and floors, we are reproducing from ROCK PRODUCTS for February, 1907, the standard specifications adopted by the National Association of Cement Users, which is the best and most authoritative document upon the subject extant. It is equally valuable for use in the construction of barn floors, the floors of cow sheds as well as the sidewalks for cities and towns, as the same has been carefully drawn up by the best practical experts of the country under the guidance of able technical organization and advice.

STANDARDS PECIFICATIONS FOR CEMENT SIDEWALKS.

MATERIALS:

1. *Cement.* The cement shall meet the requirements of the specifications for Portland cement of the American Society for Testing Materials, and adopted by this Association (Specification No. 1), January, 1906.

2. *Sand.* Sand shall pass a No. 4 screen and be free from foreign matter, excepting loam or clay, which will be permitted if the quantity does not exceed five (5) per cent and when these ingredients do not occur as a coating on the sand grains.

Not more than 40 per cent shall be retained on a No. 10 sieve, or 35 per cent pass a

No. 10 and be retained on a No. 20 sieve.
No. 20 and be retained on a No. 30 sieve.
No. 30 and be retained on a No. 40 sieve.
No. 40 and be retained on a No. 50 sieve.

Not more than 20 per cent shall pass a No. 50 sieve, or 70 per cent pass a

No. 10 and be retained on a No. 40 sieve.
No. 20 and be retained on a No. 50 sieve.

3. *Stone.* Stone shall be crushed from clean, sound, hard, durable rock, be screened dry through a ¾-inch mesh, and be retained on a ¼-inch mesh.

4. *Screenings.* Screenings from the crushed stone specified above, which shall meet the requirements for sand, may be substituted for sand if so approved.

5. *Gravel.* Gravel shall be clean, hard and vary in size from that retained on a one-quarter (¼) inch mesh to that passing a three-quarter (¾) inch mesh.

Unscreened gravel shall be clean, hard and contain no particles larger than three-quarters (¾) inch. The proportion of fine and coarse particles must be determined and corrected to agree with the requirements for concrete.

6. *Water.* Water shall be reasonably clean, free from oil, sulphuric acid and strong alkalies.

FORMS.

7. *Lumber.* Forms shall be of lumber, free from warp, and not less than one and three-quarters (1¾) inches thick. All mortar and dirt shall be removed from forms that have been previously used.

8. *Setting.* The forms shall be well stacked to the established lines and grades, and their upper edges shall conform with finished grades of the sidewalk, which shall have sufficient rise from the curb to provide proper drainage; but this rise shall not exceed one-quarter (¼) of an inch per foot, except where such rise shall parallel the length of the walk.

9. *Cross Forms.* At each block division cross forms shall be put in the full width of the walk and at right angles to the side forms.

10. *Expansion Joint.* A metal parting-strip one-half (½) inch thick shall take the place of the cross-forms at least once in every fifty (50) linear feet of sidewalk. When the sidewalk has become sufficiently hard, this parting-strip shall be removed and the joint filled with suitable material prior to opening the walk to traffic. Similar joints shall be provided where new sidewalks abut curbing or other artificial stone sidewalk.

11. *Wetting.* All forms shall be thoroughly wetted before any material is deposited against them.

SIZE AND THICKNESS OF BLOCKS.

12. *Business Districts.* In business districts blocks shall be so divided that no dimension shall be greater than six (6) feet; thickness of sidewalk shall correspond directly with the greatest dimension of the walk, as follows:

Block 6 x6 feet; thickness 6 inches.
Block 5 x5 feet; thickness 5½ inches.
Block 4½x4½ feet; thickness 5 inches.
Block 4 x4 feet; thickness 4 inches.

13. *Residence Districts.* In residence districts the thickness shall be as follows:

Block 6x6 feet; thickness 6 inches.
Block 5x5 feet; thickness 5 inches.
Block 4x4 feet; thickness 4 inches.
Block 3x3 feet; thickness 3 inches.

In residence sidewalks it shall be permissible to lay sidewalks with a thickness at the edges twenty-five (25) per cent less than the thickness at the center.

14. *Minimum Thickness.* In no case shall the thickness of the walk be less than three (3) inches.

SUB-BASE.

15. *Preparation.* The sub-base shall be thoroughly rammed, and all soft spots removed and replaced by some suitable hard material.

16. *Fills.* When a fill exceeding one foot in thickness is required, it shall be thoroughly compacted by flooding and tamping in layers of not exceeding six (6) inches in thickness, and shall have a slope of not less than one (1) to one and a half (1½).

The top of all fills shall extend at least twelve (12) inches beyond the sidewalk.

17. *Wetting.* While compacting, the sub-base shall be thoroughly wetted and shall be maintained in that condition until the concrete is deposited.

BASE.

18. *Proportions.* The concrete for the base shall be so proportioned that the cement shall overfill the voids* in the sand by at least five (5) per cent, and the mortar shall overfill the voids in the stone or gravel by at least ten (10) per cent. The proportions shall not exceed one (1) part of cement to eight (8) parts of the other materials.

19. *Voids.* When the voids are not determined, the concrete shall have the proportions of one (1) part cement, three (3) parts of sand or screenings and five (5) parts stone or gravel. A sack of cement (94 pounds) shall be considered to have a volume of one (1) cubic foot.

20. *Mixing.* (a) Hand Mixing.—The sand shall be evenly spread on a level, water-tight platform, and the cement spread upon the sand. After thoroughly mixing, dry, to a uniform color, water shall be added in a spray, and the mass turned until homogeneous mortar of even consistency is obtained. To this mortar shall be added the required amount of stone or gravel previously drenched, and the whole shall then be mixed until all the aggregate is thoroughly coated with mortar.

Where unscreened gravel is used, the cement and gravel shall be thoroughly mixed, dry, until no streaks of cement are visible. Water shall be added with a spray in sufficient quantity to render, when thoroughly mixed, a concrete equivalent to that specified above.

Water may be added during the process of mixing, but the concrete shall be turned at least once immediately after its addition.

(b) Mechanical Mixing.—Machine mixing will be acceptable when a concrete equivalent in quality to that specified above is obtained. The mixing of mortar and concrete shall be thorough and satisfactory.

21. *Retempering.* Retempering will not be permitted.

22. *Depositing.* The concrete shall be deposited within sixty (60) minutes after being mixed, and shall be transferred to the forms in water-tight wheelbarrows. The wheelbarrows shall not be filled so full as to permit mortar to slop out, and shall not be run over the freshly laid concrete.

The concrete shall be spread evenly and tamped until water flushes to the top.

23. *Separation of Blocks.* Separation of the blocks should be done with a tool not over six (6) inches wide and one-quarter (¼) inch thick, and to insure complete separation the groove should be cut through into the sub-base. Fill the groove with dry sand before the top coat is spread, and the top coat should be cut through to the sand after floating and troweling and a jointer run in the groove; then again draw a trowel through the groove, so as to insure a complete separation of the block.

24. *Protection.* Workmen shall not be permitted to walk on freshly laid concrete, and where sand or dust collects on the base, it shall be carefully removed before the wearing surface is applied.

25. *Thickness.* The wearing course shall have a thickness of at least three-quarters (¾) of an inch.

26. *Mixing.* The mortar shall be mixed in the same manner as the mortar for the base, but the proportion of one (1) of cement to two (2) of sand or screenings, and it shall be of such consistency as will not require tamping, but will be readily floated with a straightedge.

27. *Depositing.* The mortar shall be spread on the base within thirty (30) minutes after mixing, and in no case shall more than fifty (50) minutes elapse between the time that the concrete for the base is mixed and the time that the wearing course is floated. A thin coat of mortar shall be floated onto the base before spreading the wearing surface.

28. *Marking.* After being worked to an approximately true surface, the block markings shall be made directly over the joints in the base with a tool which shall cut clear through to the base and completely separate the wearing courses of adjacent blocks.

29. *Edges.* The blocks shall be rounded on all surface edges to a radius of not less than one-quarter (¼) inch.

30. *Troweling.* When partially set, the surface shall be troweled smooth.

31. *Roughening Wearing Surface.* On grades exceeding five (5) per cent the surface shall be roughened. This may be done by the use of a grooving tool, toothed roller, brush, wooden float or other suitable tool; or by working coarse sand or screenings into the surface.

32. *Color.* If color is desired, only mineral colors shall be used, which shall be incorporated with the entire wearing surface.

SINGLE-COAT WORK.

33. *Proportions.* Single-coat work shall be composed of one (1) part of cement, two (2) parts of sand and four (4) parts of gravel or crushed stone, and the blocks separated as provided for in the specifications for two-coat work.

34. *Finishing.* The concrete shall be firmly compacted by tamping and evenly struck off and smoothed to the top of the mold. Then, with a suitably grooved tool, the coarser particles of the concrete tamped to the necessary depth, so as to finish the same as two-coat work.

PROTECTION AND GRADING.

35. *Protection.* When completed, the sidewalk shall be kept moist and protected from traffic and the elements for at least three (3) days. The forms shall be removed with great care, and upon their removal earth shall be banked against the edges of the walk.

36. *Grading.* Grading after the walks are ready for use should be on the curb side of the sidewalk, one and one-half (1½) inches lower than the sidewalk, and not less than one-quarter (¼) inch to the foot fall towards the curb or gutter. On the property side of the walk the ground should be graded back at least two (2) feet and not lower than the walk; this will insure the frost thawing the walk alike on both sides.

These specifications have been published in pamphlet form by the National Association of Cement Users, and duplicate copies may be had by members of that body by applying to the permanent office of the association, which is located in the Harrison Building, Philadelphia, Pa.

*To determine voids, fill a vessel with sand and let net weight of sand equal B. Fill same vessel with water and let net weight of water equal A.

$$\text{Per cent voids} = \frac{A \times 2.65 - B}{A \times 2.65} \times 100$$

This formula may also be used in determining voids in crushed stone and screenings by substituting for 2.65 the specific gravity of the stone.

The following is a more simple method for determining voids in coarse aggregate: Fill a vessel with the aggregate and let net weight equal B. Add water slowly until it just appears on the surface and weigh. Let net weight equal A. Fill same vessel with water and let net weight equal C.

$$\text{Per cent voids} = \frac{A - B}{C} \times 100$$

Use a vessel of not less than one-half (½) cubic foot capacity. The larger the vessel, the more accurate the results.

Side Talk

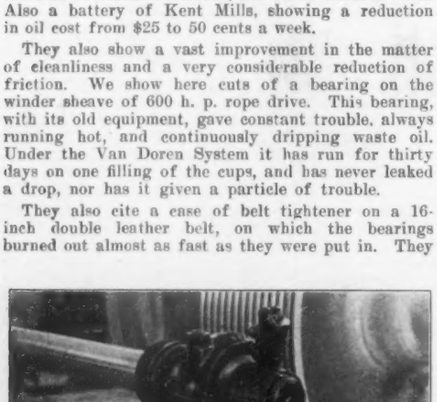
Something New In Journal Lubrication.

The Van Doren Lubricator has recently been put on the market. This is a device involving entirely new principles, which promises to do wonderful things in the machinery world, particularly on heavy duty machinery and in places where there is a great deal of dust and grit to contend with.

The C. J. Van Doren Company state that the results which have been obtained with this device are in many cases little short of wonderful. There have been very few installations where an oil saving of less than 75 per cent has been effected. The manufacturers give as one instance the kilns in a large cement mill, where they claim that they have reduced the cost of lubricant from $4.20 to 25 cents a week. Also a battery of Kent Mills, showing a reduction in oil cost from $25 to 50 cents a week.

They also show a vast improvement in the matter of cleanliness and a very considerable reduction of friction. We show here cuts of a bearing on the winder sheave of 600 h. p. rope drive. This bearing, with its old equipment, gave constant trouble, always running hot, and continuously dripping waste oil. Under the Van Doren System it has run for thirty days on one filling of the cups, and has never leaked a drop, nor has it given a particle of trouble.

They also cite a case of belt tightener on a 16-inch double leather belt, on which the bearings burned out almost as fast as they were put in. They



BEFORE APPLICATION OF VAN DOREN OILER.

have run this for three weeks on one filling of the cups, and it has never run warm, nor has it wasted any grease where formerly there was an ever-increasing pool under the bearings at all times.

Odinary bearings on elevators, counter shafts, etc., will run anywhere from three months to a year on one filling of the cups, and never require any attention whatever.

This device is now in use in almost all of the cement mills in the western field, and is rapidly gaining recognition in the mills, crushing plants, etc., in other sections of the country.

The new 5,000 barrel cement mill of the Iowa Portland Cement Company, built by the Hunt Engineering Company and now nearing completion, will be equipped throughout with this device.

The scientific fact which is the foundation upon which this lubricator rests is that a good lubricant will not wear out. It can be burned up, run to waste, or its efficiency can be destroyed by the introduction of grit or foreign matter. Very little lubricant is necessary to give proper lubrication. Enough to form a smooth, slippery coating between the shaft and the bearing is all that is necessary, and no more should be fed as long as this coating lasts.

By the Van Doren System a good sized body of grease rests directly on the shaft, being held in place by a wooden gland which conforms exactly with the contour of the shaft. There is absolutely no pressure on the grease. The friction caused by starting the machinery will cause enough grease to be carried away by the shaft to give the desired coating, and as soon as this friction is reduced no more grease will feed until there is further need of it, as shown by the generation of more friction, when the same principles will apply as when the machine is first started. In case of heat, the grease resting directly on the shaft will be softened and run freely until the extra need is met and the bearing restored to normal conditions.

The wooden gland, referred to above, is held in place against the shaft by a spring which is fastened at the top to a pressed steel ferrule, which has been inserted in the bearing cap and fastened to it. The whole is covered over with a tight-fitting nickeled cap, making the whole absolutely dust-tight—and presenting a very neat, attractive appearance.

Among the successful tests, which have been made in actual operation, we find cement kilns, hammer mills, Kent mills, elevators, counter shafts, line shafts, blowers, motors and many other kinds of machinery.

The manufacturers will guarantee results on any shafting running under 100 R. P. M., and on any shafting under 4½ inches in diameter at any speed up to 1,500 R. P. M.

This device is manufactured by the C. J. Van Doren Company, 5-17 West Madison Street, Chicago.

"Business has been good this year and month, considering that July and August are the slow months of the year, and from the standpoint of the number of customers we have sold this year—a larger number than we sold last year. But prices are simply bad, a condition which probably will be remedied in time. Aside from this matter of close competition, resulting in lower prices than should exist, the prospects for the future are bright," said O. E. Moats, of the Austin Manufacturing Company.

"Among the sales we have made are to the Shenango Lime and Stone Company, of Newcastle, Pa., who are enlarging their crushing plant at Leetonia and have ordered all the necessary equipment, consisting of a No. 6 crusher, elevator and seven hoists; to the corporation of Prince Albert, Saskatchewan, Canada, which has just ordered, through Mussens, Limited, of Montreal, a complete No. 4 Austin crushing plant; to the Ruggles Granite Company, of Granite, Okla., who have placed an order with us for a complete No. 5 crushing plant.

"Mussens, Limited, have just sold to J. D. MacDonald, at Saskatchewan, Saskatoon, Canada, a complete No. 4 crushing plant.

"We have just shipped to J. Laughlin, Los Angeles, Cal., a complete No. 5 crushing plant, sold by Henshaw, Buckley & Company, San Francisco, Cal.

"A. B. Black, Boston, Mass., recently sold the Dunstable Granite Company, of Dunstable, a No. 5 Austin crusher, with No. 7½ elevator and large screen. This plant will be put in operation August 1."

The C. O. Bartlett & Snow Company, of Cleveland, Ohio, who are engineers and manufacturers of elevating and conveying machinery, direct and steam heat dryers, etc., write us under date of July 10 that during the past week they have closed contracts through F. C. Greene, mining engineer, for complete coal mine equipments for the McGillveary Coal and Coke Company, at Coleman, Alberta, and for the West Canadian Colliers Company, at Bellevon, Alberta.

Their contract includes a steel tipple with all the necessary machinery, including the Greene patent transfer dump, type 4, for each plant, as well as a complete power plant equipment and haulage system for both plants. The plants will be entirely electrically operated and are to be in operation by November 1 of this year.

The C. O. Bartlett & Snow Company manufacture complete equipments for economically handling all kinds of material. They solicit inquiries.

The Raymond Concrete Pile Company, of New York and Chicago, through its Schenectady representative, G. W. Van Vranken, has secured the contract for the placing of 675 Raymond concrete piles in the foundations of the Schenectady County Court House, Schenectady, N. Y. W. L. Stoddart, New York, is the architect of the building. The Raymond Company also secured, through Mr. Van Vranken, the contract—which has just been executed—for the concrete piling foundations of the pattern storage warehouse of the General Electric Company at Schenectady; C. E. Hulth, superintendent of grounds and buildings.

The Richardson Scale Company, offices No. 3 Park Row, New York City, and 122 Monroe Street, Chicago, have issued a new circular that should be of special interest to all cement manufacturers. It treats of automatic weighing in the manufacture of cement and shows that an absolutely safe system will be inaugurated if their scales are used.

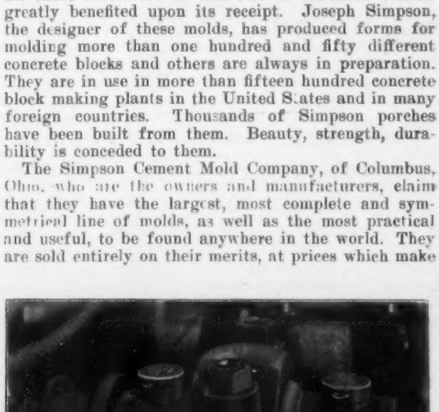
By their new patent electric gear two or more scales will work as one, and discharge simultaneously. Pulverized, granular or lumpy materials are handled with equal facility. There can be no inaccuracy due to flushing or to arching of materials. Almost no attention is required, and the cost of maintenance is the minimum. Many cement manufacturers are now using their scales and a vast improvement in the product invariably results when the materials are combined by them. These machines are equally good for mixing clinker and gypsum, etc.

The circular explains all points clearly. It is profusely illustrated and free for the asking.

The Ernst Wiener Company, of 196 Fulton Street, New York City, announce that Walter J. Briggs has resigned as director, secretary and treasurer, and that no further connections exist between him and the company. They also announce that Arthur P. Van Schaick, president of the W. K. Kenly Company, has been elected a director and second vice-president of their company, with headquarters in Chicago.

"The June, 1909, Simpson Concrete Porch Book" was issued only a few days ago. It gives an exposition of the Simpson cement molds, so fully and graphically told, and so beautifully illustrated that all those interested in this line of business will be greatly benefited upon its receipt. Joseph Simpson, the designer of these molds, has produced forms for molding more than one hundred and fifty different concrete blocks and others are always in preparation. They are in use in more than fifteen hundred concrete block making plants in the United States and in many foreign countries. Thousands of Simpson porches have been built from them. Beauty, strength, durability is conceded to them.

The Simpson Cement Mold Company, of Columbus, Ohio, who are the owners and manufacturers, claim that they have the largest, most complete and symmetrical line of molds, as well as the most practical and useful, to be found anywhere in the world. They are sold entirely on their merits, at prices which make



AFTER APPLICATION OF VAN DOREN OILER.

them a highly profitable investment for their owners, and under the fullest guarantee that they will prove satisfactory in every respect.

They are of the best quality of iron, fitted and finished with great accuracy and in a thoroughly workmanlike manner. They are easily operated; are strong, rigid and durable for an unlimited amount of work.

The Simpson Cement Mold Company ably fill a nitch in the concrete industry that is all its own.

Write for this Porch book and let it tell its own story.

If it were not that in putting up our permanent structures we desire to make them pleasing to the eye as well as useful and convenient, we would employ engineers as designers rather than architects. It is the architect's business to combine beauty with utility, and since we employ architects we have a right to expect that our buildings should *look* right as long as they stand.

One of the most disappointing changes of appearance that can occur in a structure is that caused by poor or fading colors in the mortar, brick or cement. The Ricketson Mineral Paint Works, of Milwaukee, Wis., state that where Ricketson's mineral colors are specified, however, you may be assured that as long as the structure stands the tinted portions will look as bright and clear as they did the day they were put up. "Time, the great leveler," has been busy these many years proving that Ricketson's colors absolutely never fade or run. Their great purity makes them go farther, too, so that it is well worth while to specify them from the standpoint of economy alone.

"Utica Cement, the Bricklayer's Cement," is the title of a little pamphlet issued by the Utica Hydraulic Cement Company, of Utica, Ill. Here the appeal is

specially made to architects, builders, contractors and dealers.

It is obvious to them, as constant users of cement, that, in all practical work, that cement is best which will secure the best results; and when this can be attained by the smallest expenditure of money and labor it follows that both excellence and economy are attained.

Utica cement is offered to them upon the broad claim that the above combination is fully secured in its use. They state that this claim is capable of demonstration and is sustained by experience.

In considering what is most desirable in the practical use of cement it cannot be denied that for three-quarters of the work in which cement is used ultimate stability is the end to be attained, and if this can be done with economy in expenditure, ease in manipulation and present reliability until the end sought is reached a high combination of excellent qualities is secured.

This applies to cement in general, but in this pamphlet reference to cement for bricklaying in particular is treated.

A good bricklayer's cement must possess all the following requirements, viz.: Uniformity, binding strength, plasticity, non-staining, economy, color, durability, fireproof qualities.

Because it possesses all of these necessary requirements in a more marked degree than any other product Utica cement is claimed by them to be pre-eminently the ideal.

The following reasons are then given:

Utica cement is always uniform. Being a natural product, its chemical composition, unlike that of artificial cement, never changes.

Its great binding strength makes a wall erected with Utica cement a homogeneous mass. The mortar, getting harder with age, finally becomes harder than the brick it cements together.

It is very important that a brick mortar should work cool and easy under the trowel, enabling the workmen to spread the mortar uniformly and strike a neat, smooth joint.

Utica cement is of a light buff color and is stainless. It is especially adapted for use with Bedford stone and delicate tinted brick. Where a certain color effect is desired Utica cement can be colored to suit, without effecting in any way the strength of the cement.

As to durability, it has stood the test of time for over seventy years, and thousands of structures throughout the land stand today as monuments and incontestable proof of the value of Utica cement as a permanent and durable building material.

It is absolutely fireproof. Hydraulic cement has been known from the earliest times as among the most refractory of substances, and has been put to the most severe tests, having been used for furnaces, kiln lining and for linings in fireproof safes and vaults.

Besides all these points of excellence we mention last, but not least, that of economy.

It is economical to use Utica cement for brick and stone mortar. It is in most localities as cheap as lime, and cheaper and far better than Portland cement tempered with lime.

A long list of prominent buildings built with Utica cement, with numerous illustrations, is appended. It is decidedly an interesting pamphlet.

The Maumee Chemical Company, Toledo, Ohio, have issued a little booklet giving the merits of, and the process, by which their "Maumee" brand of water proofing compound is used.

Water-proofed concrete is as necessary to perfect construction work as Portland cement itself is to the making of concrete, although this is one of the truths that is too often overlooked or disregarded.

It is with a view of introducing into concrete construction an agent which will act as an absolute barrier against the penetration of water, that they are placing their "Maumee" compound before the building public.

They state that the process of water-proofing as embodied in the "Maumee" compound has points in its favor which must appeal to every architect, contractor, or owner of a building. Among these are:

First. Its undeniable efficiency, as proved by practical experience.

Second. Its varied adaptabilities.

Third. The ease and readiness with which it is applied, and the saving in time, since the water-proofing can be begun and completed without a break in the operation.

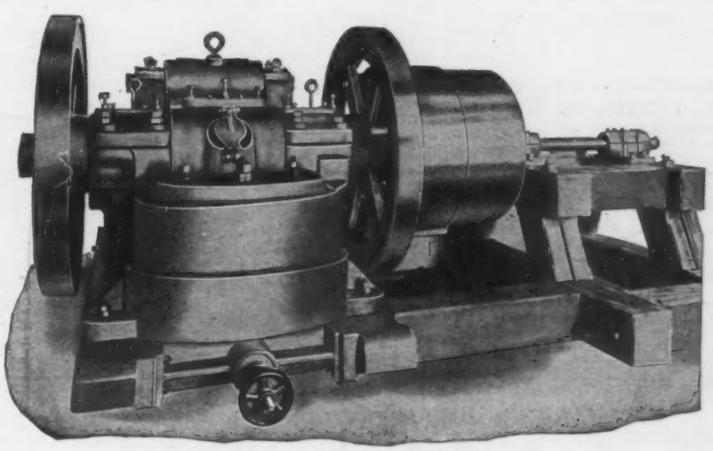
Fourth. Its accessibility in case of repairs, since it is always in view.

Fifth. Its economy; the additional expense in the use of "Maumee" compound being but a trifle, and the benefits great; in fact, instead of incurring extra expense in the building of concrete block houses, there is a saving effected, in, that plastering can be done directly on the block, and no furring and lathing is necessary.

"Maumee" compound is a dry powder, to be mixed with cement which is incorporated with the concrete. It is essentially water-repelling in character, and, becoming an integral part of the concrete mass, it completely destroys the one objectionable quality of concrete—its too great capacity for absorbing water. The concrete treated with "Maumee" compound is made permanently water-proof, since it is in itself an indestructible material, and its water-repelling property remains fixed and permanent. It improves the color of the concrete, also keeps in check the exudation of salts which cause the unsightly blotches known as efflorescence, and does not impair its strength or set.

For what purposes, it is particularly adapted, where and how it should be applied, its covering capacity and cost are all treated fully, carefully and explicitly. Its use in connection with the manufacture of cement blocks, in the construction of reservoirs, in reinforcing concrete walls, in water tight floors, for cellar walls and for exterior house plastering is told in detail. All cement users will be interested in its perusal. Sent free upon application.

The Henry Martin Brick Machine Manufacturing Company, of Lancaster, Pa., have recently shipped several carloads of their modern rock and ore crushers to southern California and also several carloads to Utah for special heavy duty in crushing the ore.



MARTIN'S NEW ROCK AND ORE CRUSHER.

We show in the illustration one of the latest improved eccentric pattern jaw crushers, which has a receiving opening of 24"x16". It shows the rear view of the crusher, having out-board bearing with tight and loose pulley. All the bearings are chain oiling bearings, the parts heavily and broadly designed, with all the modern improvements in detail, and material of the very best.

The Martin company are manufacturing a variety of sizes of the type of crusher as shown above, and whilst these crushers are heavily proportioned throughout, they are neat in design and low in cost.

The Cement Tile Machinery Company, of Waterloo, Ia., are preparing for a large fall trade. They are sending out their new catalogue on the subject of concrete drain tile, and its advantages over any other kind of tile. In farming localities, where drain tile is needed and used, this is a profitable line for a cement user. This company is now building an addition to their building, which will be used for their executive offices. They are increasing the number of their office and shop force as well.

The Berg Machinery Manufacturing Company, Limited, of Toronto, Canada, after a long experience in the manufacture of sand-lime and sand-cement brick, have come to the conclusion that these products must be manufactured so as to have them absolutely uniform; therefore, after the required proportions in any particular case has been found, an excess of lime or cement (whichever used in the brick) is not a benefit, but rather the reverse. At the same time the bonding material is the most costly and an excessive proportion would be a complete loss. To obviate this, and in order to make all such brick unform and of the most perfect manufacture they have invented and put on the market the Berg automatic measuring machine, simple, accurate and durable, which insures a uniform product and which saves labor and money. This machine will measure any three materials, such as sand, lime and coloring; sand, cement and coloring; and is also adapted for measuring clays where certain proportions of each material is required. It it guaranteed fully by the Berg Machinery Manufacturing Company.

The Sharon Steel Hoop Company, Commercial National Bank Building, Chicago, announces a new line of slotted steel studding for fireproof partitions, furring and suspended ceilings. It is another high grade specialty which is introduced by this enterprising concern, who have already won a favorable position in the building specialty trade with their line of metal corner bead for protection of plastered corners and angles. Harry T. Gilbert, the genial salesmanager of the specialty department of this concern, announces that a very satisfactory business has already been established for this new specialty, which bids fair to equal the wonderful popularity of his corner bead.

Since the appearance on the market of ready roofings that need no painting, there has been a very lively curiosity on the part of many people to see the goods. Accordingly the makers of Amatite, the best known of this class of roofings, have arranged to supply samples to an inquirer free of charge.

These samples show the goods complete with the mineral surface which replaces paint as a protection against the weather, and it is easy to obtain a very good idea of just what Amatite is like.

All you have to do in order to obtain the sample is to send a postal card request for same to the nearest office of Barrett Manufacturing Company, at New York, Chicago, Philadelphia, Boston; Cincinnati, Cleveland, Pittsburg, Minneapolis, St. Louis, Kansas City or New Orleans.

The Big Rock Stone and Construction Company, of Little Rock, Ark., are doing a larger business than ever before. They are in need of an additional No. 8 crusher and an elevator to go with it in order to increase the size of their operations.

H. C. Bernard, of Queen City Quarry Company, East St. Louis, Ill., remarks that business is a little quiet, although practically all of the quarries on the east bank of the Mississippi River in the St. Louis district have some orders to keep the grinding

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The Manistee Brick Company, Manistee, Mich., has issued a booklet of forty pages containing matters descriptive of the merits of Manistee sand-lime brick and cuts of many buildings constructed of these brick. The book should convince any person who is intending to build of the merits of this product.

Milton J. Williams, sales manager of the Williams Patent Crusher and Pulverizer Company, says that the call for Williams and Sturdevant crushers is keeping them busy these days. Their new $60,000 addition at St. Louis is nearing completion and they will be able to better care for their increasing business with this.

CLASSIFIED ADVERTISEMENTS

Advertisements will be inserted in this section at the following rates:

For one insertion .....25 cents a line
For two insertions.....45 cents a line
For three insertions.....60 cents a line

Eight words of ordinary length make one line.
Heading counts as two lines.
No display except the headings can be admitted.

Remittances should accompany the order. No extra charges for copies of paper containing the advertisement.

EMPLOYEES WANTED

WANTED.

If you are in need of or wish to sell anything which comes under any of these classifications, write us. If you have something not coming under these classifications we will create one for you.

WANTED

Experienced wall plaster salesman for New York and New England territory. None other need apply. State references and salary. Address
BOX 707, care ROCK PRODUCTS.

EMPLOYMENT WANTED

POSITION WANTED

Wanted—position as general manager of rock crushing plant. Am well qualified and can give the best of references. Address BOX 710, care ROCK PRODUCTS.

WANTED—POSITION

as superintendent of stone crushing plant or concrete plain and reinforced. Address.
BOX 705, care ROCK PRODUCTS.

CEMENT SALESMAN

now employed and making good under present conditions, desires connection with a mill in the middle or far West. Address BOX 708, care ROCK PRODUCTS.

WANTED POSITION

as general manager of rock crushing stone or lime plant; large plants preferred. Am well qualified in every particular. Correspondence solicited. Address
BOX 706, care ROCK PRODUCTS.

MATERIAL FOR SALE

FOR SALE.

Brass letters and figures to imbed in cement walks, curb blocks, etc.; reversed letters and name stamps to make impressions in cement.
Send for price list.
H. W. KNIGHT & SON, Box R, Seneca Falls, N. Y.

MACHINERY FOR SALE

CRUSHER FOR SALE.

Gates No. 4 Gyratory, in fine condition. Cheap.
R. P., BOX 2, Sta. A., Cincinnati, O.

ENGINES AND BOILERS FOR SALE.

Engines—Corliss, Automatic and Throttling, all sizes from 1 to 500 H. P.
Boilers—Horizontal, Portable and Vertical, all sizes from 1 to 200 H. P.
Pumps, Heaters, Tanks, Sawmill and General Machinery.
Write for our prices on your requirements.
THE HANDLE MACHINERY CO.,
1745 Powers St., Cincinnati, O.

FOR SALE.

No. 3 Raymond Roller Mill with 60-inch Sturtevant fan, Vacuum separator, with all fixtures complete and in good order. Address
ST. LAWRENCE TALC & ASBESTOS CO.,
Massena, N. Y.

FOR SALE CHEAP.

6 No. 9 Ingersoll-Rand steam drill, 2 sets steels; 10-ton stiff leg derrick, pulleys and cable; 12-inch white pine, both good as new. Address
GEO. S. RODOCK, Frederick, Md.

FOR SALE.

9 H. S. Palmer cement block machines.
1 half yard self-dumping car.
1 half yard Drake stationary concrete mixer.
Write D. J. KENNEDY CO.,
No. 6366 Frankstown Ave., Pittsburg, Pa.

FOR SALE

2—100-inch fans or blowers.
1—110-inch fan or blower.
Water jacketed bearings, pulley drive, upward discharge. Made by the American Blower Co., Detroit, Mich. Used only a few weeks; in good condition. Will be sold at a bargain. Address
PENINSULAR PORTLAND CEMENT CO.,
Jackson, Mich.

FOR SALE

One Allis-Chalmers portable No. 1 Style D Gates crusher, with 25 H. P. Fairbanks & Morse gasoline engine, all belting, shafting, pulleys, circulating tanks, pipe fittings; painted and erected on 40,000-pound flat car. Present location, Leesport, Pa. For further information address COMMONWEALTH ROOFING CO., 17 Battery Place, New York, or Warren-Ehret Company, Land Title Building, Philadelphia, Pa.

FOR SALE.

One Allis-Chalmers, Portable No. 1, style D, Gates crusher, with 25-h.p. F. & M. gasoline engine, all shafting, pulleys, belting, pipe fittings, painted and erected on forty thousand pound flat car. Address
BOX 713, care ROCK PRODUCTS.

MACHINERY WANTED

WANTED

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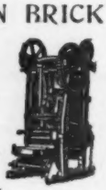

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In three days by handling brick over the old method.

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New Advertisements

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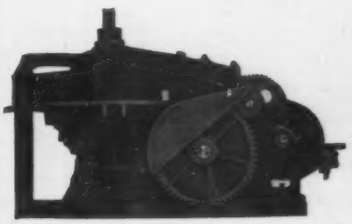

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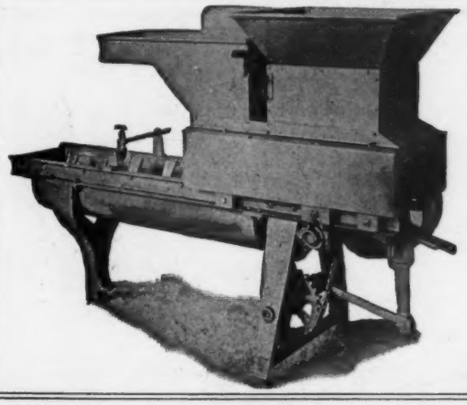

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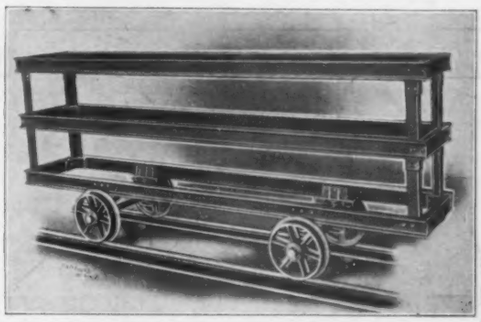

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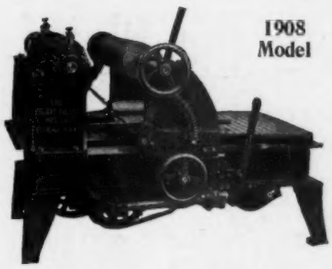

1908 Model

Has an automatic, proportional, increasing feed, which keeps grade of fiber uniform from start to finish, and holds machine to highest possible rate of production for the grade of fiber and number of saws. Does not begin with fiber and end with dust, nor fall off in rate of production on each log, from 40 to 80 per cent as do the ordinary non-increasing feed machines. Works logs up to 24x24 inches. No royalty string attached to sale. Pay no attention to misrepresentations of our competitors, but write for descriptive circular and terms to

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Thousands in use.

Plans and specifications furnished for any sized plant.

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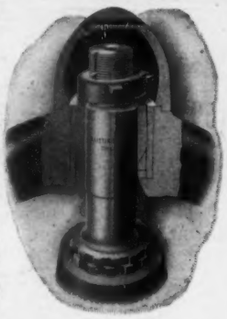

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Style No. 1, 7x8 Jaw Opening, 4 Horse-power.

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This illustration shows the exact product, numbered from 1 to 8, that our CRUSHERS produce. Would you not be interested in a crusher if we guarantee to produce from 10 to 20 tons in ten hours with this little No. 1 machine, from 3 to 4-inch material at one operation? We have sold over 200 of these machines in the past year, and they are doing just this very kind of work. We manufacture twenty different-sized crushers.

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Quit wasting money and making bad concrete with that "batch" machine. Don't fuss and lose time with complicated mixers. Let us tell you about this simple, strong machine.

The Svenson Concrete Mixer

Has only five moving parts, all on one shaft. It keeps going and it keeps the men going.

We want to tell you our ideas on proper mixing, for the "Svenson" mixes dry, then wet—the only scientific way. And it proportions the mix positively, just the way you set it.

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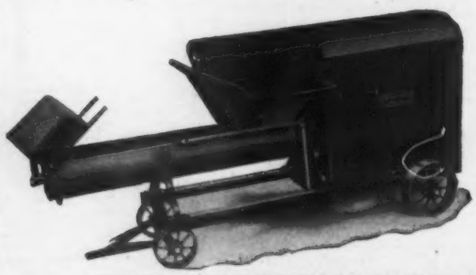

Measures exactly any and all kinds of material, either wet or dry, and mixes them perfectly. It has no gears, springs or cogs, and but one sprocket chain. Proportions and capacities are changed outside of the hoppers, and instantly. Does away with expensive delays and breakdowns. Pivot bearings. Steel construction. Unbreakable. Bearings removed from dirt. The most simple and dependable proportioning mixer on the market. Sold on trial. With various equipment. For all kinds of work at PRICES FROM $175.00 UP.

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Also Besser Block and Brick Machines, Fence Post and Ornamental Molds, Monolithic Sewer and Culvert Forms. The Besser $95.00 Hand Batch Mixer should be in every small block plant. Send for free literature and 25 cents for large Catalogue and Instruction Book.

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WHAT DO YOU CRUSH?

On difficult reduction propositions, there is no breaker which can equal, in output, durability and general efficiency, the

SYMONS CRUSHER

A No. 5 Symons Crusher is being used, with great success, by the Montello Granite Company, Montello, Wisconsin, upon the **hardest granite in the United States,** doing more work than a No. 6 Old-Line Gyratory, previously used on the same work.

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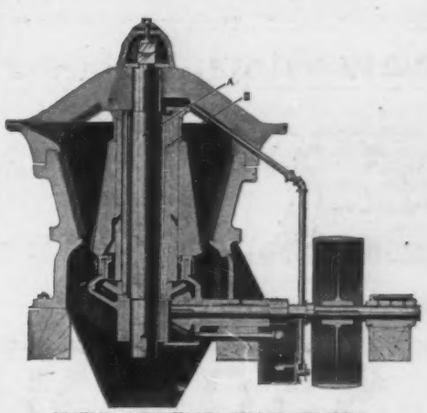

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A—Revolving Eccentric Sleeve.
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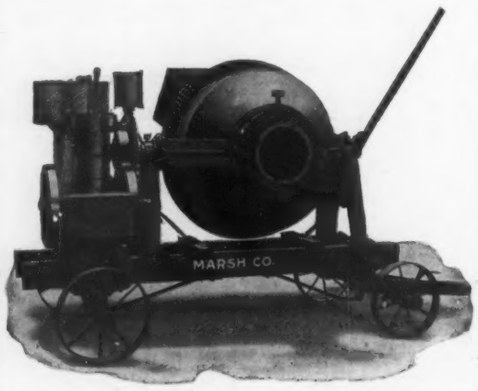

Furnished with any combination of power and mounting, chain or gear connection at option.

Marsh-Dexter Mixer

We claim a lot for this machine.

If our claims are true you want to know it.

If you will write us we will tell you how to find out.

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RAW MATERIAL GRINDERS

New Williams Universal

FOR TUBE MILL FEED

800 BARRELS 22 HOURS
95 PER CENT THROUGH 20 MESH
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WE ALSO GRIND
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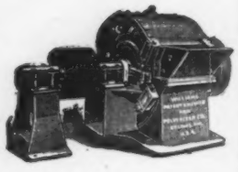
TAKES MATERIAL FROM GYRATORY, DIRECT



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FINENESS ½ IN., ¼ IN. AND ⅛ IN.
HORSE POWER 40 TO 45
1,300 MILLS NOW IN USE

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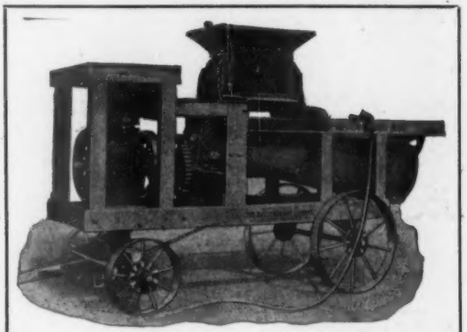
Coltrin Concrete Mixers



No. 9 Coltrin with 2½ H. P. Engine

THE GAMER COMPANY, Inc.
HEATING AND PLUMBERS' SUPPLIES
TANK AND TANK TOWERS
GAMER WIND MILLS

Ft. Worth, Texas, December 14, 1908.

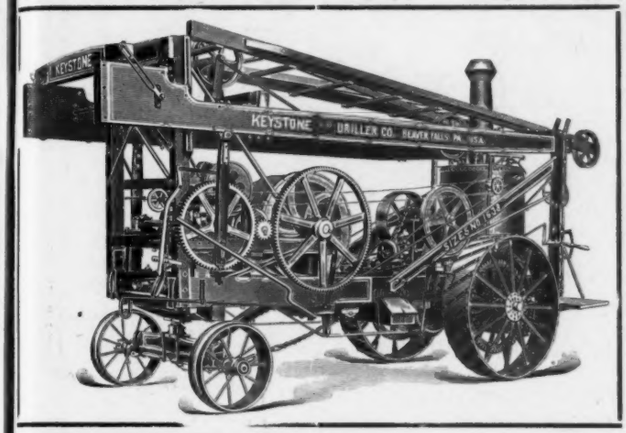
DEAR SIR: Replying to your letter of inquiry, we are glad to say the work of your No. 6 Coltrin Mixer which was placed in our building is doing everything that you claimed for it, both in regard to speed and quality of mix.

Yours very truly, THE GAMER COMPANY,
Chas. Gamer, President.

WE SHIP THE COLTRIN MIXERS ON APPROVAL, ALSO P. B. MILES LATEST BLOCK MACHINE, THE OLIVER AUTOMATIC, AND A FULL LINE OF CONCRETE MACHINERY.

N. J. Morehouse
Waterloo, Iowa.

KEYSTONE CHURN DRILLS FOR HEAVY BLAST HOLES



IN CEMENT and STONE QUARRIES, where large and deep blast holes can be used to advantage, these machines form the cheapest and quickest means of sinking 6 inch holes.

Penetrate any formations, any depth, 30 or 300 feet. Self-moving or portable, if desired.

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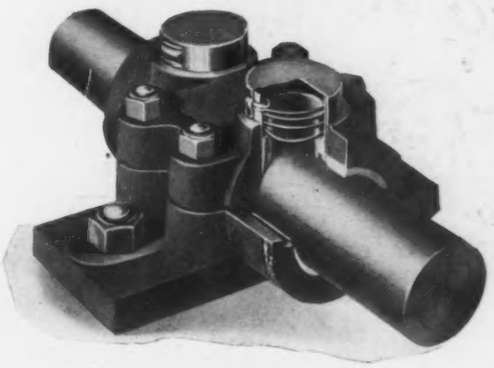

Perfect Journal Lubrication by a System Involving New Principles

The Van Doren not only is the very latest lubricating device, but it is the very best because

It does exactly what it is designed to do.

It is economical, so great a money saver that it will pay for itself in a few months on oil saving alone, to say nothing of labor.

It is neat and attractive in appearance, occupies little space.

It does away with unsightly pools of oil and ugly, greasy bearings.

Practically dust proof—no burned out bearings and big repair bills.

It works while the oiler sleeps.

THE C. J. VAN DOREN CO. 5 West Madison Street, CHICAGO

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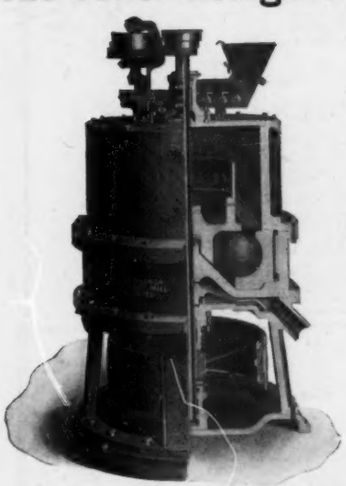

Cement Companies equipped with Fuller Mills advertise the fact that the consumer gets 38 pounds more of the IMPALPABLE POWDER or REAL CEMENT in every barrel of cement produced by The Fuller Mill than by any other

Produces Commercially

Cement having a higher percentage of Impalpable Powder than can be obtained by any other mill. Tests show that the tensile strength of a one-fourth mortar made with cement pulverized by the Fuller Mill is higher than the tensile strength of a one-third mortar made with cement pulverized to the fineness required by the Standard Specifications.

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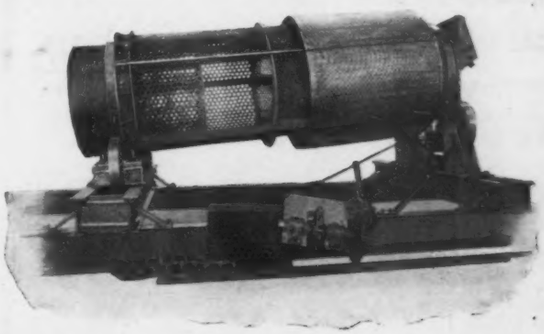

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¶ The screen shell is of TISCO MANGANESE STEEL with holes that taper outwardly, thus preventing clogging.

¶ TISCO SCREENS can be furnished in any length desired, with or without punched steel dust jackets.

¶ The best screen for sizing broken stone for concrete, ballast, roads, etc.

Do you care? Catalog?

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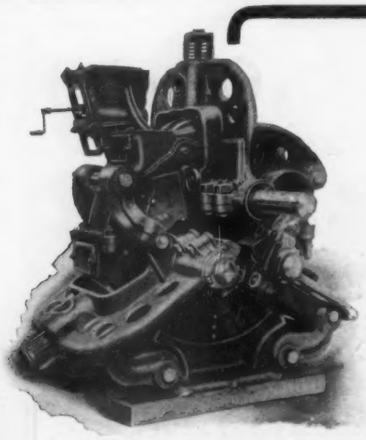
HIGH BRIDGE, NEW JERSEY



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WE DO NOT CLAIM ALL of the CREDIT for this achievement

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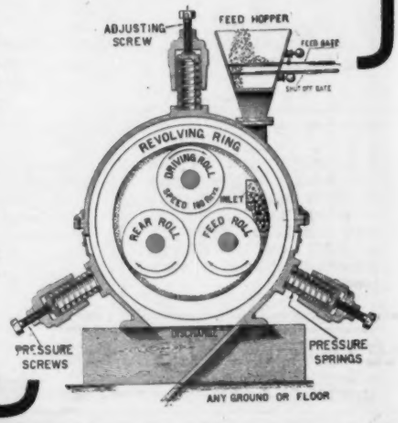
Its GRINDING ACTION is DIFFERENT than any other; besides the STRAIGHT ro'ling action of the rolls, the SIDE to SIDE motion of the ring makes the material subject to TWO crushing forces and DOUBLE OUTPUT results.



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Our bagging machines will bag 150 tons in 10 hours with two men; 80 and 100 tons are being bagged now as a daily output.

The capacity of our bag plant is now being doubled.

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USED IN ALL PARTS OF THE WORLD—LARGE RECEIVING CAPACITY—SPECIALLY DESIGNED AND CONSTRUCTED FOR HARDEST KIND OF WORK
COMPLETE CRUSHING PLANTS OUR SPECIALTY
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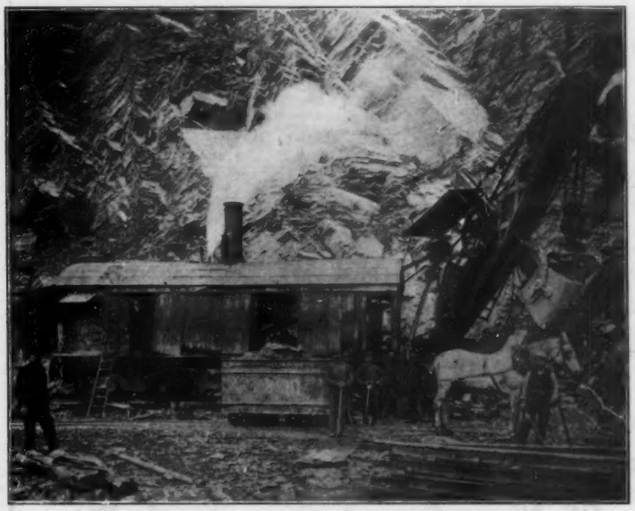
fill all the requirements of heavy quarry work, because they are correctly designed and built of only the best material obtainable. Our thirty years experience in the manufacture of these machines has taught us what is and what is not desirable in steam shovel construction, so that when you buy a Vulcan you are assured of getting the best shovel built.



"Giant Class E—65 ton shovel in Alpha Portland Cement Company's quarry."

Every shovel fully improved and guaranteed. Mounted on traction wheels or railroad trucks. Steam or electric power.

Giant Boom Shovels, 6 sizes, 45 to 120 tons, 1½ to 5 cubic yards dippers.

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95-C IN SANDUSKY PORTLAND CEMENT COMPANY'S QUARRY.

Bucyrus Shovels Are Loading Crushed Stone and Digging Blasted or Unblasted Cement Rock in the Leading Quarries in the United States.

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Which means that we are offering with our machines, Gratis to the Trade, the experience gathered in these FORTY YEARS

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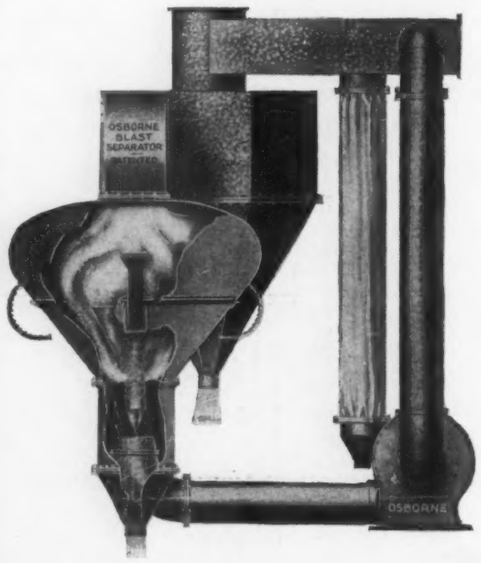

You know it costs money to separate your material after it is ground, so why not use the best means of separation?
We can prove that the

Osborne Pneumatic Blast Separator

IS THE BEST AND CHEAPEST MACHINE FOR YOU TO USE.

It will give you larger capacities for less horse power than any other machine on the market. Will separate your material to 200 mesh fine.

Capacities, from 3½ to 10 tons per hour of finished product 95% 100 mesh fine.

STOPS ALL FLOATING DUST IN YOUR GRINDING ROOM.

Circular "A" Tells You More About It.

Manufactured by

THE GRISCOM-SPENCER CO. 90 West Street, New York City

In Producing Cement Clinker, what is YOUR Grinding Cost?

A statement is being advertised that "5 mills, grinding enough raw material to produce nearly 1,200 barrels of clinker per day is a record."

NOW

We will guarantee (and our guarantee is worth something) that
3 Raymond Roller Mills will grind enough raw material to produce fully 1,200 barrels of clinker per day.

Moreover—

The Raymond Mills will take the material direct from crusher or rolls and thus save the expensive preliminary grinders necessary with other types of mills.

Furthermore—

We will also guarantee that the finished product from the Raymond Mills will be 98% 100 mesh fine and 92% 200 mesh fine.

If you are going to install grinding or separating machinery for handling cement or any other material you can not afford to act without having a talk with us.

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The "Berg Press" is the Highest Development in the Art of Brick Making Machinery, so Pronounced by the United States Government

Highest Grade
BRICK MACHINERY
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FOR
SAND-LIME, SAND-CEMENT
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Each system we guarantee are unequaled and further advanced than any others

Cement Machinery
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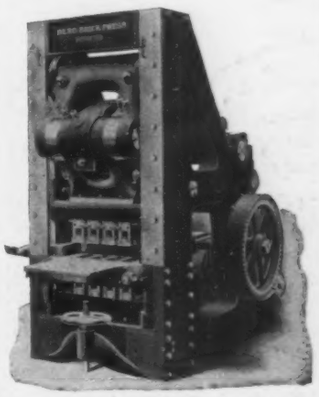

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Highest Efficiency Guaranteed.

The Berg Machinery Manufacturing Co., Ltd.
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Since it has been proved that our Patented Method for mixing sand and lime for the manufacture of brick or stone, commonly known and named by us the

"Division Method"

is a success, and the only way of producing a high grade brick or stone of real merit at a low cost, others are offering to install a

"Division Method" or a "Division System"
AS SOME CALL IT

Although we fully appreciate the high compliment paid us by such attempts to imitate our process

WE DESIRE TO WARN INVESTORS

that such imitation or "just as good" methods are failures, because "they do not deliver the goods". Moreover, any successful imitation would be an infringement on our process which is fully covered and protected by Letters Patent in the United States and all foreign countries. We will protect our patents and prosecute infringements.

We erect and equip up-to-date factories completely, furnishing machinery of special design for our use and operated under our Patented

"Division Method"

producing the highest grade brick or stone possible to make at less cost than can be produced by any other system or machinery. Correspondence Solicited.

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BUILDERS' SUPPLY DEALERS CAN MAKE TWO PROFITS!

Both Manufacture and Sell Rader Patented Plaster Board

If you are selling plaster boards you are making one profit. Why not manufacture them and make both **manufacturers'** and dealers' profits? With

RADER'S PATENTED MOULDING TABLES

you can manufacture the best plaster boards on the market and at less cost than the largest manufacturers, enabling you to compete with any brand, both in quality and price.

PLASTER BOARDS

are rapidly displacing all kinds of lath, being fire and vermin proof, lower in price, more rapid and economical in construction, stronger and more durable.

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made only with **Rader's Patented Moulding Tables** are the most satisfactory now on the market. Cannot be broken as can others, thereby eliminating all risk of loss by breakage in transportation or general rough handling. They have to be sawed in two. Each side of the board is adapted to different purposes thus having a double advantage over any other make. Three plants are now in operation to meet a growing demand.

A COMPLETE PLANT CAN BE INSTALLED AT A SMALL COST

as the **Rader** apparatus is licensed at a very low price and only a very small space is required for its operation. The device makes boards from ¼ to 1 inch in thickness.

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Write us for Samples and Further Information.

GUSTAVE RADER CO. 1105 Metropolitan Ave. BROOKLYN, N. Y.

GET THE BEST

Finest Line of Gypsum Machinery

MADE

KETTLE CRUSHER NIPPERS

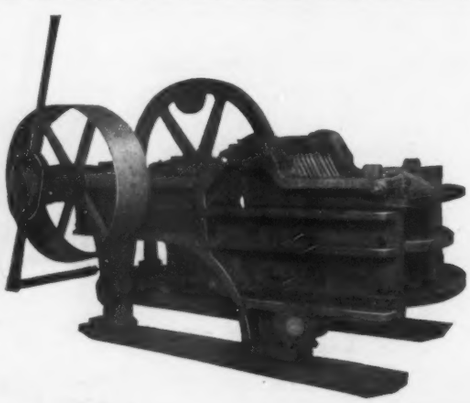
ASK FOR CATALOG OF

MOGUL NIPPERS, OPEN DOOR POT CRUSHERS

Best Mills in the United States Have Them

McDONNELL BOILER & IRON WORKS, Des Moines, Iowa, U. S. A.

"Formerly Des Moines Mfg. & Supply Co."



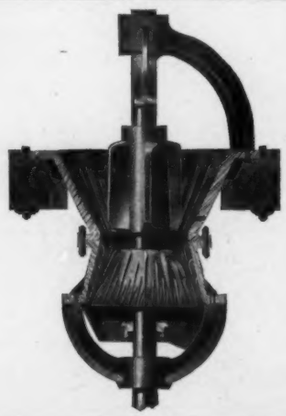
CRUSHERS

for soft rocks, burnt lime, etc.

GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

SPECIAL CRUSHER-GRINDERS FOR LIME HYDRATORS



BUTTERWORTH & LOWE

17 Huron Street, GRAND RAPIDS, MICH.

Stucco Retarder

Strong
Uniform
Fine Ground
} RETARDER

We are the oldest Retarder firm in the United States, and above is our motto. New fire-proof plant and prompt service.

FREE SAMPLE ON REQUEST

Chemical Stucco Retarder Co.
WEBSTER CITY, IOWA.
INCORPORATED 1895

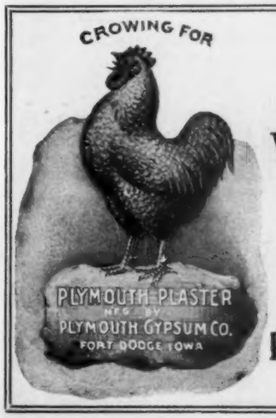
Plaster! Plaster!

Iowa Hard Plaster Co.

HARD BY NAME. HARD BY NATURE.
HARD TO BEAT. NOT HARD TO GET.

Iowa Hard Plaster Co. FT. DODGE IOWA....

CROWING FOR



PLYMOUTH CEMENT
AND
WOOD FIBER PLASTER

The Brand that's Made from Pure Gypsum Rock.

WRITE US FOR PRICES AND ADVERTISING MATTER.

Plymouth Gypsum Co.
Fort Dodge, Iowa

SLOTTED STEEL STUDDING

FOR FIREPROOF PARTITIONS, SUSPENDED CEILINGS, FURRINGS.

Mechanical Advantages of
Slotted Steel Studding

It is horizontally braced every 16 inches of its height.

The Slots afford a passage for conduits.

Wood blocks inserted in the slots act as a nailing base for grounds.

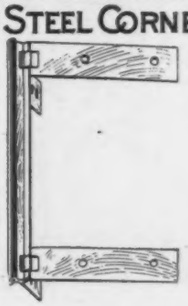
It is adaptable to all kinds of expanded or wire lath.

It economizes weight and space.

It is made in channels, from Open Hearth Steel, having great tensile strength and rigidity.

Write for detailed blue prints and cost data on its various applications.

PARKER STEEL CORNER BEAD



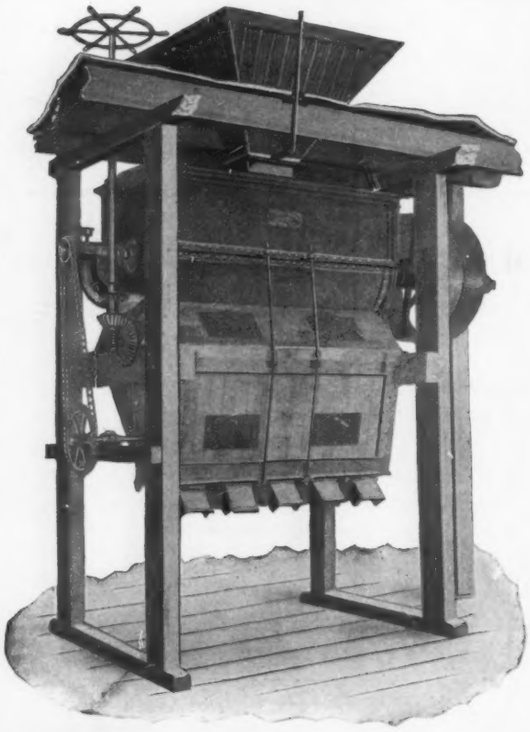
The owner who fails to use corner bead will have to pay many times its cost in repairing his plastered corners.

The architect who specifies and the owner who uses **"Parker Steel Corner Bead"** once will have no other.

Stock Lengths: 6, 7, 8, 9 and 10 feet.
WRITE FOR PRICES.

SHARON STEEL HOOP COMPANY,
COMMERCIAL NATIONAL BANK BUILDING,
CHICAGO

N.Y. REPRESENTATIVE: FULLER BROS. & COMPANY,
139 GREENWICH ST. NEW YORK.



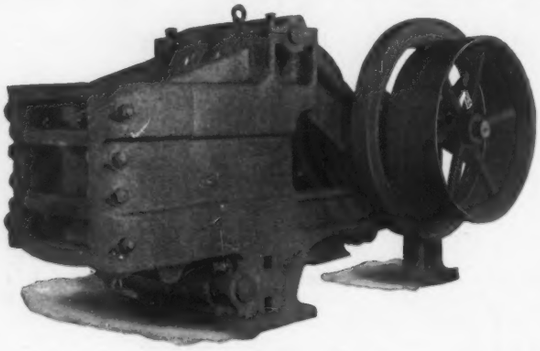
ENTERPRISE PLASTER MIXER

NOISELESS,
DURABLE and EFFICIENT.

For Mixing Hair Fibre, Wood Fibre and Retarder with Dry Plastering Materials.

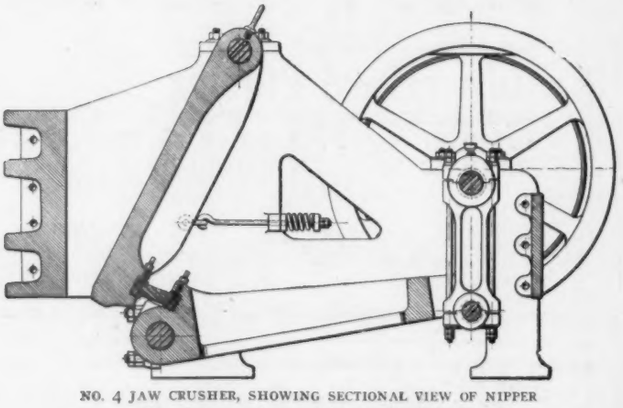
Calcining Kettles

Jaw and Rotary Crushers for Gypsum, Reels, Vibratory Screens, Hair Pickers and Transmission for applying power.



EHRSAM NO. 4 JAW CRUSHER.

This machine will handle large chunks and reduce from 30 to 40 tons of Gypsum per hour to 2½-inch maximum or smaller if wanted.



NO. 4 JAW CRUSHER, SHOWING SECTIONAL VIEW OF NIPPER
The jaw opening at inlet is 18x28 inches.

The J. B. Ehrsam & Sons Mfg. Co.,

BUILDERS OF

COMPLETE EQUIPMENTS FOR PLASTER MILLS

Enterprise, Kansas

Does Quality Appeal to You?
Does Prompt Service Appeal to You?
Does Reliability Appeal to You?

Then Buy

Your Stucco and Wall Plasters of

The

AMERICAN GYPSUM CO.

PORT CLINTON, OHIO

Quality **Strength** **Reliability**

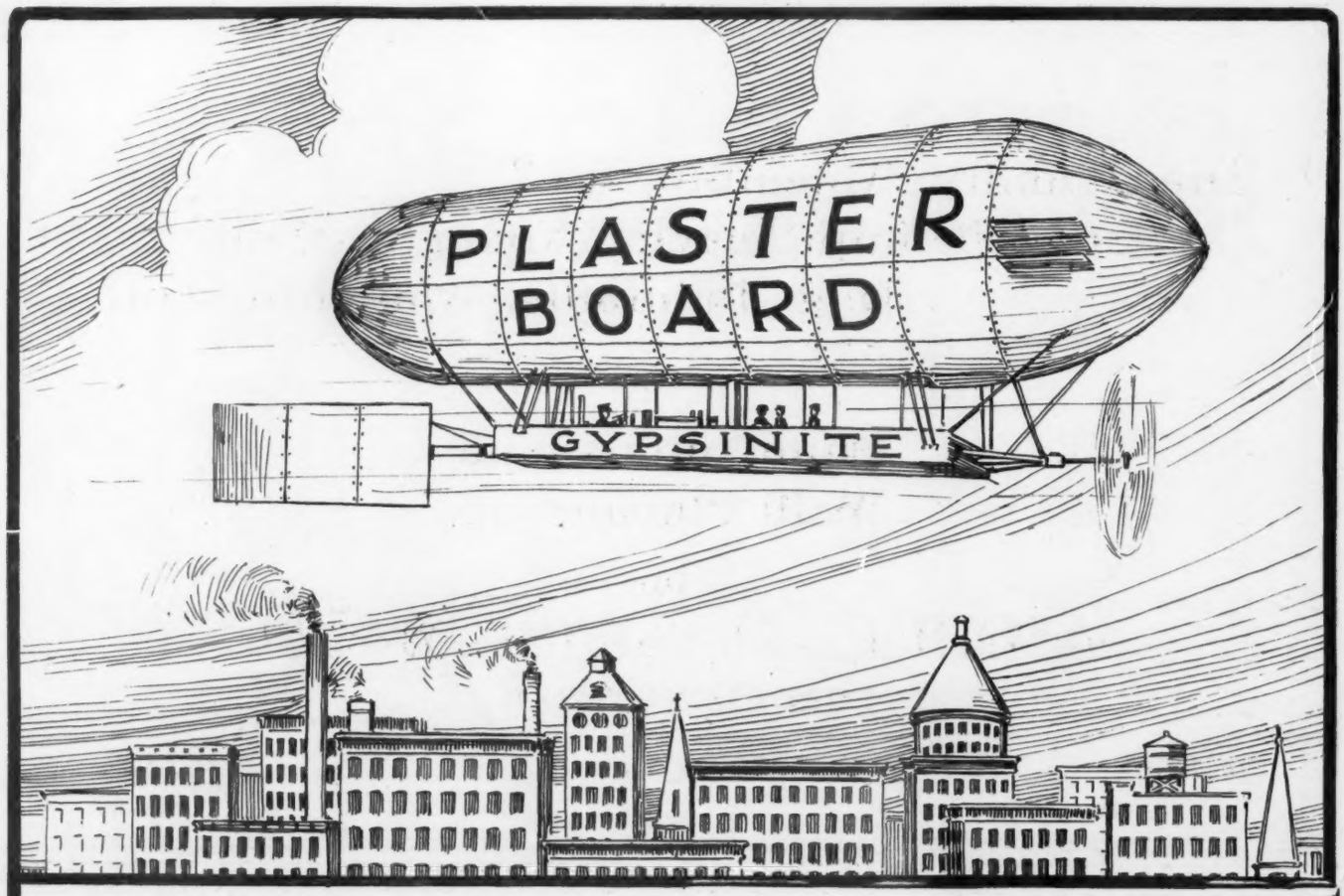
RETARDER Wood Fiber

THE OHIO and BINNS RETARDER CO.
PORT CLINTON, OHIO

Reliable Stucco Retarder=Strong=Uniform in Strength=
Duplicate power plant (electric and steam power) installed so as to preclude any possibility of shut down and consequent shut down of mixers who depend upon us for their supply of Retarder. We have a capacity large enough to supply every retarder user in the U. S. and Canada, and some to spare for Europe. Our mills are fireproof in every particular. Write us for prices and information.

THE OHIO and BINNS RETARDER CO.
PORT CLINTON, OHIO

Tell 'em you saw it in ROCK PRODUCTS



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DEALERS everywhere report **big sales** and **increasing profits** on **PLASTER BOARD** and **GYPSINITE.** These two up-to-date building commodities are **fast rising** in the estimation of architects, contractors, and builders.

PLASTER BOARD is replacing lath and **GYPSINITE** in taking the place of wood studding in all up-to-date construction. They are fireproof, soundproof, and economical.

If you are not already featuring **PLASTER BOARD** and **GYPSINITE, begin now.** In this age of the flying machine, when the whole world is alive to things new and better, you ought to see a splendid opportunity for yourself in these advanced construction materials. They offer you new sources of **profit** and as an up-to-date dealer you can't afford not to carry them.

Write or wire now for quotations, or literature, and in ordering up-to-date materials, remember the importance of up-to-date **SERVICE**—make it read "U. S. G. Co."

Address our nearest office.

UNITED STATES GYPSUM CO.

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SACKETT·PLASTER·BOARD

FIRE PROOFING

Instead of Lath

Time Saving

Labor Saving

Money Saving

The board that made plaster boards famous

First used in 1891 Perfected in 1908

SACKETT PLASTER BOARD Co

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NEW YORK

UNITED STATES GYPSUM CO.
CLEVELAND,
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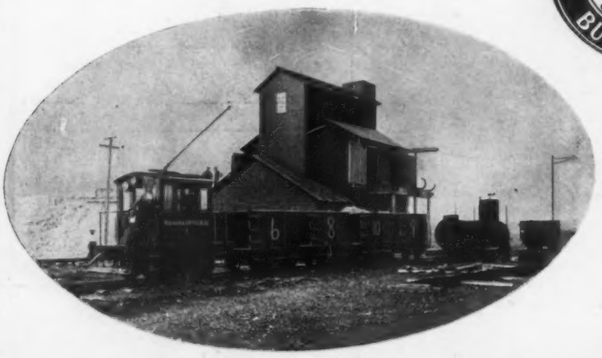
MANUFACTURERS OF

GYPSUM PRODUCTS

MINES and MILLS Oakfield, N.Y. **GENERAL OFFICES** Buffalo, N.Y.

Our electrically equipped mines and mills are now in operation with a capacity of 300 tons per day, and we assure you of prompt service.



We Manufacture Stucco, Neat Cement Plaster, Ready Finish, Wood Fibre Plaster, Finishing Plaster, Sanded Wall Plaster, Crushed Rock, Land Plaster.

SPECIAL MACHINERY AND FORMULAS

FOR THE MANUFACTURE OF

WOOD FIBRE PLASTER, FIRE PROOFING AND KINDRED PRODUCTS

We furnish the latest improved FIBRE MACHINE, (fully patented) also FORMULAS, on a reasonable proposition. The strongest companies and oldest manufacturers are operating under my contracts.

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The Ohio Fibre Machinery Co. J. W. VOGLESONG, GENERAL MANAGER **Elyria, Ohio**

KING'S WINDSOR CEMENT

FOR PLASTERING WALLS AND CEILINGS

Elastic in its nature, can be applied with 25 per cent less labor and has 12½ per cent more covering capacity than any other similar material

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WOOD WALL PULP PLASTER

BEST SAFEST SUREST

Wood Fiber or Wood Pulp, the wall plaster that stays.
No Sand. Pure Gypsum.
Our RELIANCE BRAND is the Highest Grade of Perfection in Wood Fibered Material.

QUALITY STRENGTH CAPACITY

EMPIRE GYPSUM COMPANY, - - Garbutt, N. Y.

The Improved Peerless

One-Man Cement Brick Machine

Equipped with new tamping device, which tamps ten bricks in the machine at one operation, making 12,000 perfectly formed bricks in ten hours.

The superiority of the Peerless Brick Machine was demonstrated conclusively at all of the recent conventions.

It is the greatest invention in the industry. Simple, strong and durable. Combines all the advantages of every other machine at the smallest cost.

The most successful and most easily operated one-man brick machine ever made.

Write at once for particulars.

Peerless Brick Machine Co.

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HERCULES

BLOCK MACHINES

ARE THE FASTEST, SIMPLEST, STRONGEST AND

BEST MACHINES BUILT

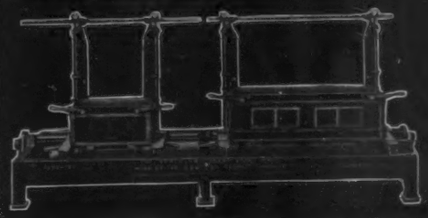
AND WE CAN PROVE IT

THEY EXPAND TO MEET EVERY DEMAND

THE ONLY machine making any size of stone from a 3 inch block to a 6 foot water table.

THE ONLY face down machine that allows for a really coarse WET mixture with fine facing.

THE ONLY machine on which four 16 inch stone can be made at ONE time, or two 20 inch, 24 inch or 32 inch stone at one time.



THE HERCULES IS AN OLD ESTABLISHED MACHINE

Built along Correct Lines and Endorsed by the Leading Contractors and Builders. They are used in all parts of the world.

They make the kind of blocks that sell. "Hercules" Blocks, The kind the trade demands. Send for Catalogue.

Century Cement Machine Company

288-298 St. Paul St.
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THIS new illustrated **sixty-four page catalog** has just been received from the press and will be mailed to you **free** upon receipt of your request.

It is a book compiled after many years of experience in the manufacture and use of concrete machinery and equipment, and embodies many fine-toned illustrations of the highest class concrete machinery in existence. It also contains much useful information for the buyer and will be found a handy reference book.

If **you** are in the market for anything in the line of concrete machinery or equipment **you** should receive this catalog before purchasing. The merits of the machines and the clear illustrations are sure to **please** and **interest** you. Don't put it off—send us your name right now. Tell us just what you are interested in most and receive this catalog with complete information and prices.

THE S LINE

The Cement Tile Machinery Co.

740-45 Rath St., EAST WATERLOO, IA.

THE JUNE, 1909

Simpson Concrete Porch Book

IS NOW READY

Its pages are crowded with beautiful engravings showing Simpson molds and handsome porches made from them.

Our June, 1908, Porch Book was the sensation of the Cement Block Making Trade. The new one is much better.

We will be glad to send this book free to those who have a real business interest in it and who send us their own business stationery or other printing showing what business they are in. To others we will send it for 15 cents, which does not cover cost. Address

The Simpson Cement Mold Co.

498 North High Street, - - Columbus, Ohio, U. S. A.

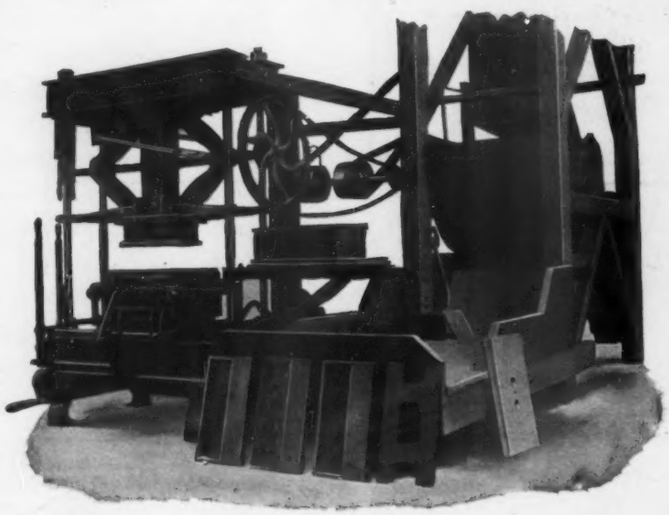
PERFECTION AT LAST ATTAINED IN THE CONCRETE BLOCK INDUSTRY

THE PERFECTION POWER BLOCK MACHINE is the only Power Block Machine on the market, making a Hollow Concrete Building Block under Heavy Pressure and at Great Speed.

Machines have been in constant use since July 1st, 1905, with practically no expense for repairs.

The machine handles sand, gravel, crushed rock, slag and coloring materials perfectly.

All materials accurately measured, thoroughly mixed and uniformly pressed under 200,000 pounds pressure.



Makes 8, 9 and 12x8x24 inch blocks in five faces, and fractional and angle blocks.

Machine can be arranged to make Two Piece and Faced Blocks if desired.

All machines delivered, set up and put in operation to show a guaranteed capacity of 60 blocks (12x8x24 inch) per hour with 5 men.

Blocks perfectly cured in 24 hours in Vapor Curing Kilns of our own design.

Full details, catalog, testimonials, etc., sent upon request.

THE PERFECTION BLOCK MACHINE CO.

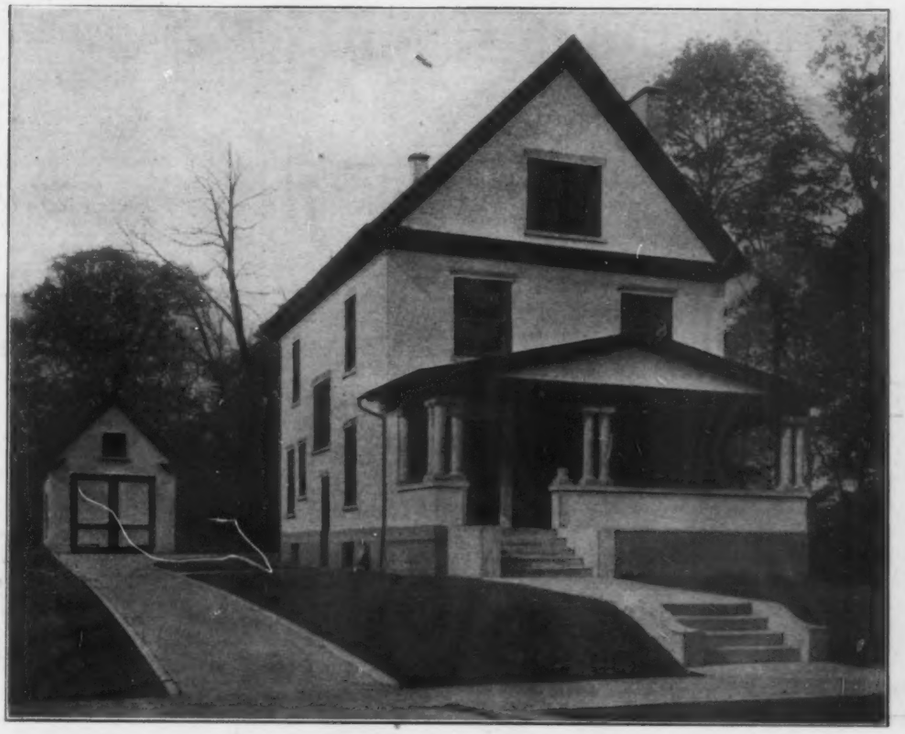
KASOTA BUILDING :: MINNEAPOLIS, MINN.

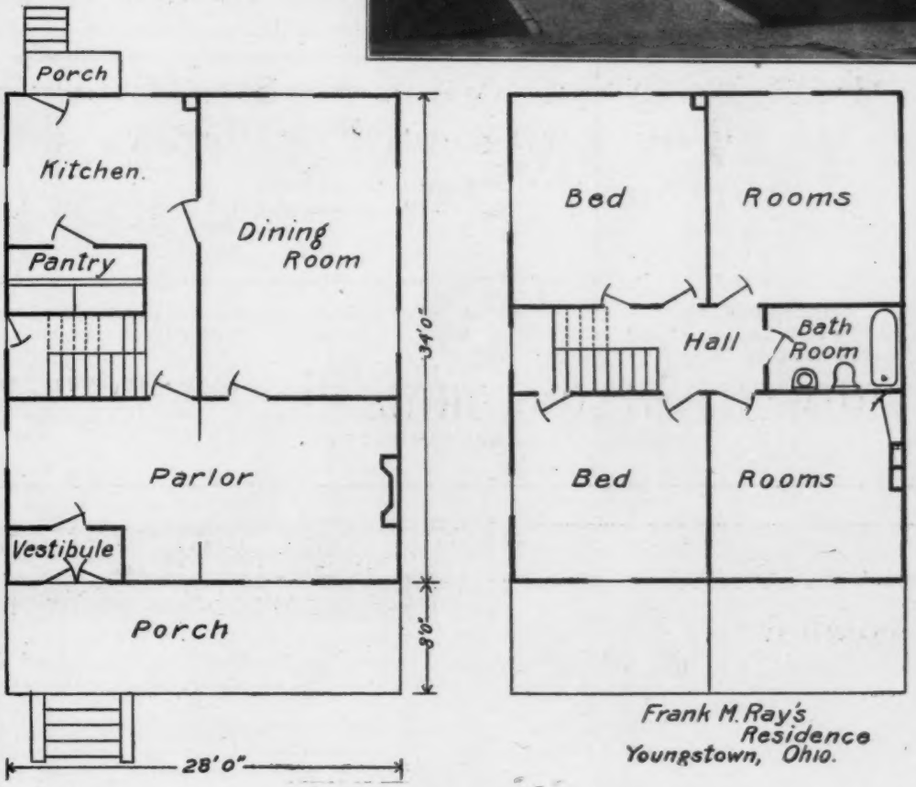
Low Cost Concrete Homes

The greatest obstacles to the use of concrete in small residence construction are: 1. The expense of form work and contractor's plant in reinforced concrete (monolithic) construction, and 2. The unsatisfactory appearance and poor waterproof qualities of concrete blocks made by the dry-tamp process. Both these obstacles have been overcome by

The Pauly Concrete Hollow Tile.

Full particulars with regard to the equipment of a suitable factory with the necessary machinery for any location will be cheerfully given, and a conservative and profitable deal will be exhibited for prospective manufacturers of concrete structural tile upon request.





Frank M. Ray's Residence
Youngstown, Ohio.

This residence is fireproof and waterproof. It was built in Youngstown, Ohio, fall of 1908, upon the following contract specifications:

Masonry work complete, including selling price of tile, concrete floor extending under entire basement and combination tile and reinforced concrete floors	$ 950.00
Excavation of cellar and construction of walks, steps, etc., outside of building proper	125.00
Lumber, hardwood lumber finish for interior and glass (including built-in furniture and plate glass mirrors)	1,000.00
Carpenter work	700.00
Slate roof and spouting	200.00
Plumbing in kitchen, bathroom and basement	250.00
Painting (exterior and interior)	125.00
Furnace and piping	150.00
Total plastering (including material)	200.00
	$3,700.00
Plus 10% profit	370.00
Total contract price	$4,070.00

The walks, driveway and steps, as well as the porch columns, are of concrete. It is sumptuously finished inside with hardwood, plate glass windows and doors with slate roof and six massive pieces of built-in furniture of elegant design, with plate mirrors, etc., all included in the figure named.

☞ There is a good business opportunity in building homes of this type in any city. We furnish the entire machinery outfit upon the basis of a lease.

Send for booklet showing a large number of houses built with this material.

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LEVIATHAN ELEVATING TRANSMITTING CONVEYING BELTING

The Belt Question

is no more what kind or brand of belting shall be used in Stone, Cement or Gravel plants. On your next order please state operating conditions so that we can get at the thickness in

Leviathan Belting

that will exactly conform to the particular service.

It 's a matter of tremendous importance.

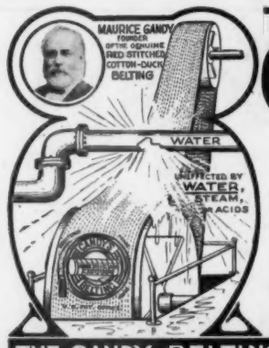
As belt specialists we can help yo ı.

Your belting interests are our interests.

MAIN BELTING COMPANY

PHILADELPHIA, PA.

Chicago New York Boston Pittsburg Buffalo



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Another Victory for GANDY RED STITCHED COTTON DUCK BELTING

On Nov. 18th, 1907, we secured a judgment against Weller Manufacturing Company for selling imitations of the Genuine Gandy.

And on Feb. 5th, 1909, the Circuit Court of the U. S., Western District of Pennsylvania, issued an injunction against C. A. Turner, Inc., from infringing upon our rights.

GANDY TRADE-MARKS are registered and will be protected, so don't be deceived. Every belt shows every ten feet "Genuine Gandy Belt."

We also make Gandy Belt Dressing and issue a free Booklet, "Experiences with Gandy."

THE GANDY BELTING CO. BALTIMORE, MD.

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FIRE BRICK

For Cement Works, Lime Kilns, Cupolas, Steel and Iron Works of every description. :: :: :: :

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The Buckeye Fire Clay Co.

Manufacturers of

Sewer Pipe, Flue Linings, Chimney Tops, Fire Brick, Grate Tile, Ground Fire Clay, Wall Coping, Etc.

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HOWELL'S Celebrated Ball Bearing Heavy Geared Post Drills

For boring anything that an Auger will penetrate.

Awarded Gold Medal, St. Louis.

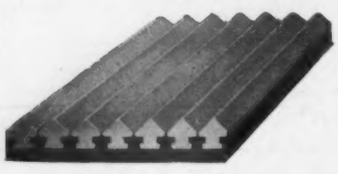
We make 40 different styles machines run by Hand, Compressed Air and Electricity for boring Fire Clay, Coal, Rock, Rock Salt, Gypsum and Plaster Rock. Send to day for our handsomely Illustrated Catalogue.

HOWELL MINING DRILL CO., PLYMOUTH, PA., U. S. A.

(ESTABLISHED 1878.)

A Tempered Steel Jaw Plate for Blake Type Crushers

CHROME STEEL WORKS
CHROME, N. J., U. S. A.
(FORMERLY OF BROOKLYN, N. Y.)



Canda Tempered Steel Crusher Jaw Plate

Patented March 31, 1908

¶ The Canda Tempered Steel Jaw Plate for Blake Crushers is composed of Forged and Rolled Chrome Steel Bars, cast-welded and also mechanically interlocked into a backing of tough steel—and the wearing face is tempered to extreme hardness. We are equipped to supply both corrugated and smooth face plates for all sizes and makes of Blake Crushers.

¶ The Canda method of cast-welding forged and tempered steel bars into a mild and tough Steel Backing, is adapted also to the construction of Cone Heads for Gyratory Crushers, Segments for Corrugated Rolls, etc., etc.

¶ Our products in this line are sold with our special guarantee that they *will wear longer, give better satisfaction and, at our price, prove more economical than any others now on the market.*

—Send for Descriptive Pamphlet—

Represented by

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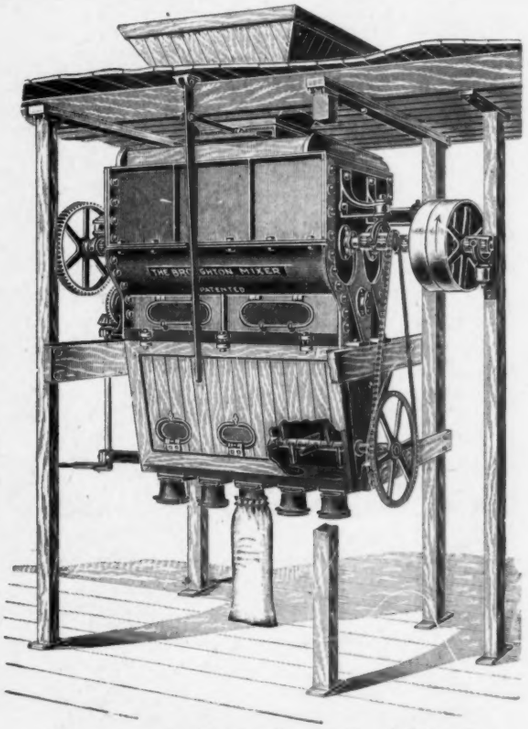
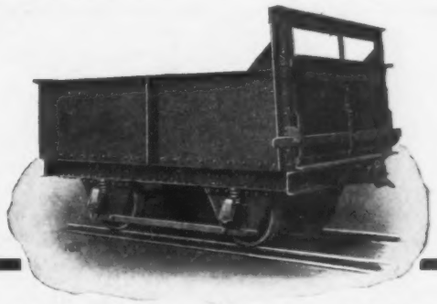


The most thorough and efficient Mixers of Plaster, Cement and Dry Materials. Send for Circular.

W. D. DUNNING, Water St., Syracuse, N.Y.



Above cut shows an all-steel car, for carrying cement, limestone, etc.

OUR STEEL CARS

Stand in a class by themselves. They are manufactured by SPECIAL MACHINERY and combine the latest ideas of design and construction. Our experience covers a period of 20 YEARS in this business and our Industrial Railway Material embodies all the features which experience has taught us to be the best.

LARGE STOCK

of Industrial Track, Frogs, Switches, Crossings, Turntables, complete track layouts, CARS, etc. Prompt shipment of all equipment.

Our Catalogue 17 is full of illustrations and gives dimensions and other valuable information—It will be sent on request.

RAILROAD SPECIALISTS FOR ALL INDUSTRIES.

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		St. Louis, Mo.
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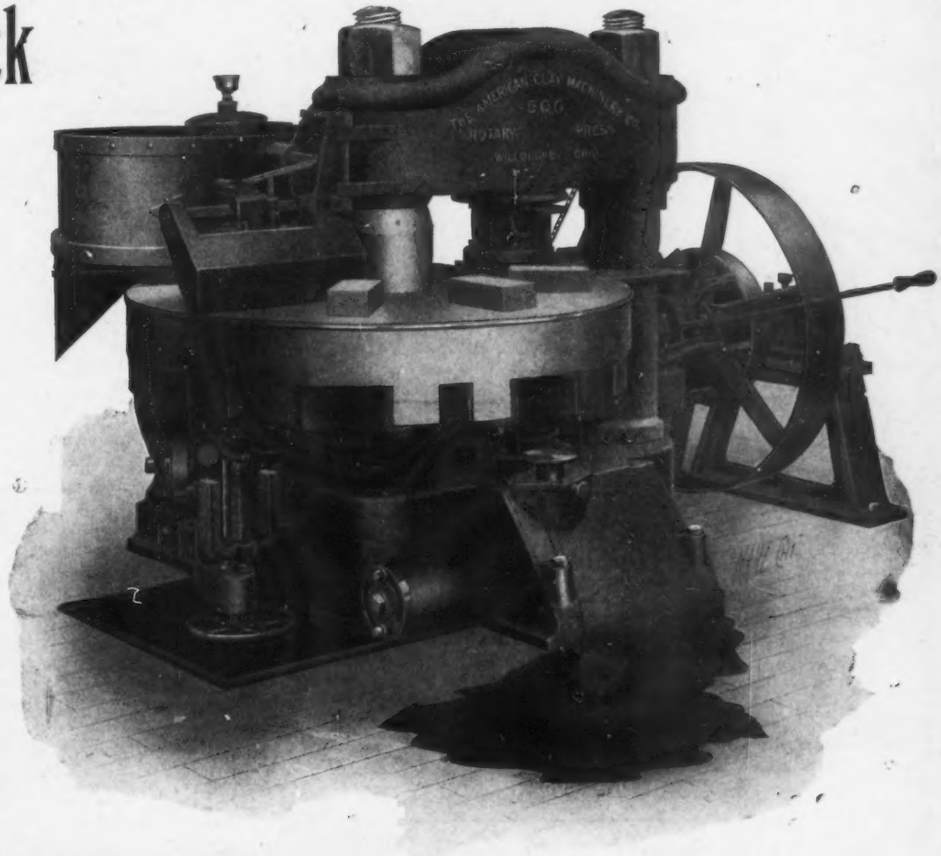
Sand-Lime Brick Machinery

OUR Sand-Lime Brick Machinery is at least a little better than any other. We have testimonials to show it. We build it all in our own factory and are sure of its quality. We are the only firm doing this. We will design and equip your entire plant or will sell you parts of your equipment. Our catalog describing and illustrating our full line will be sent upon request.

We also build a full line of machinery and appliances for making Clay Products, Cement and Pottery, Dryers and Dryer Apparatus.

Everything we sell we make. We therefore know its quality to be right.



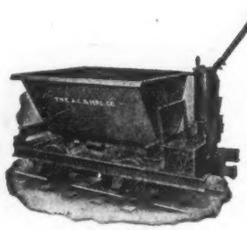
The American Clay Machinery Company

WILLOUGHBY, OHIO, U. S. A.

WE BUILD

CARS

FOR



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Side Dump Car
Equipped with Motor

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Steel Mines and Quarry Car

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Pressed Steel Top, Ball Bearing Turntable; Patented

SWITCHES, FROGS

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Steel Dumping Bucket

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GIANT CEMENT IN HUDSON TUNNELS

The news was flashed round the world on Monday, July 19th, that the great Hudson Tunnels were opened up on that day, reducing the time between New York and Jersey City to 3 minutes. In this engineering marvel, which will increase land values as well as transportation facilities for millions, and in which a city and state rejoiced

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